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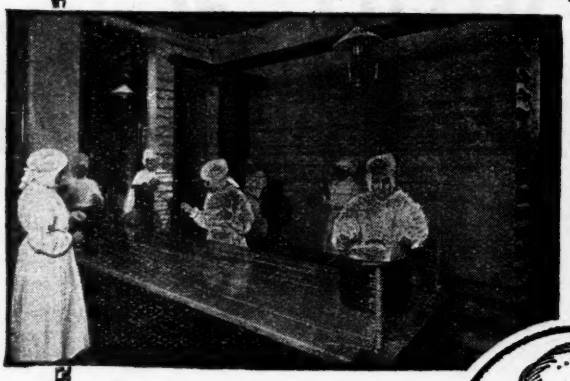
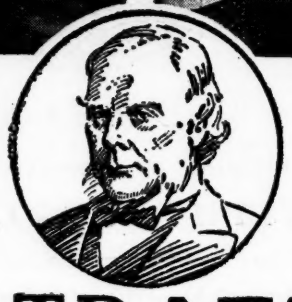


Aseptic  *Surgery*

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DELIVERED AT

THE CONVOCATION OF THE AMERICAN COLLEGE OF SURGEONS, PHILADELPHIA, OCTOBER 28TH, 1921,

BY

SIR HAROLD J. STILES, K.B.E., M.B., F.R.C.S.,

REGIUS PROFESSOR OF CLINICAL SURGERY, UNIVERSITY OF EDINBURGH.

My first duty is to thank the President and Regents of the College for so kindly inviting me to take part in the Clinic Congress. For three years in succession I had received an invitation, and gladly would I have accepted, but in view of my recent appointment to the chair of Clinical Surgery in the University of Edinburgh I did not feel justified in applying to the University Court for leave of absence. It so happened this year that the Congress of the Universities of the British Empire was holding its meetings in Great Britain when I received your invitation to be a guest at the Congress. One of the speakers, Professor T. J. Wilson of Cambridge, declared that professors should not merely be given leave of absence but should rather be hunted out of their chairs for the health of their own souls and of those committed to their care. Those words so emboldened me that I accepted your invitation on my own initiative without waiting for the permission which the university granted me later.

America has already been more than generous in making me an honorary member of the American Medical Association and of her three chief Surgical Associations. To occupy a place on the roll of Honorary Fellows of the College of Surgeons of America is an honour of which I am intensely and genuinely proud, and it is one which I and my descendants will treasure for all time as a crowning reward for my surgical endeavours. I am only too conscious that the honour is out of all proportion to my very humble achievements; rather do I regard it as a gracious compliment to the famous university to which I have the honour to belong, and as a generous recognition of the great traditions of the surgical school from which I have descended. I am particularly proud that the honour you have just conferred on me should have been received in the city of Philadelphia, the birthplace not only of the oldest medical school in the United States, but also of that one which I believe has more Edinburgh blood in its veins than can be traced in the pedigree even of Columbia and Harvard.

The war of the Revolution was the making of Morgan and Shippen, two of the greatest pioneer surgeons of the eighteenth century, both Philadelphians and both Edinburgh graduates. Physick, who was professor of surgery in the University of Philadelphia in the early part of last century, and who has often been spoken of as the father of American surgery, was also educated in Edinburgh. Then, again, we have Samuel Gross, said by some to be the father of modern American surgery. He played the same part in Philadelphia that Syme did in Edinburgh. They had much in common: both were good anatomists and pathologists as well as great surgeons; both were great diagnosticians and great teachers, and both had the art of inspiring and of retaining the affection of their pupils. Although Gross was not an Edinburgh graduate, he visited Edinburgh when Syme and Simpson were at the height of their fame.

Gross has always occupied a warm place in my heart, particularly on account of his admiration for the work of Sir Astley Cooper. Dr. Finney, in one of his admirable addresses, says: "Teachers in medical schools should not only instruct their pupils but should instil into them by precept and example the right spirit towards their profession and the right attitude towards their patients"—and this Sir Astley Cooper surely did. My grandfather, who lived to the age of 96, wrote of his great master, Cooper:

> "It would be an act of ingratitude did I omit to pay a tribute of respect to the memory of my distinguished anatomical and surgical teacher, Sir Astley Cooper. He did not owe his distinction to exalted rank or to privileges attached to high birth, but rose by the honourable exertion of his native energies, and ultimately attained the most exalted pre-eminence; indeed became one of the most illustrious surgeons that ever adorned the science he professed. To Sir Astley Cooper I am indebted, more than to any other man that ever lived, not only for the greater share of anatomical and surgical knowledge I possess, but for the privilege of witnessing in him the enthusiasm which filled his soul with an ardour and love of his profession, which incited in me a noble emulation to imitate his praiseworthy example. He stimulated me to exertion—stimulated me in the acquirement of knowledge."

Incidentally, I may say that it was through the references in my grandfather's autobiography to Sir Astley Cooper that I myself became fired with the ambition to become a surgeon. Gross, in his autobiography, said:

> "I learned my first lessons in surgery from Sir Astley Cooper's lectures, reprinted in Philadelphia soon after I began the study of medicine. Every student should read them, for they abound in good sense and sound practical knowledge."

The same remark would apply to Syme's *Principles of Surgery*. On visiting St. Paul's Cathedral Gross expressed his delight at seeing there a statue to Sir Astley Cooper, but took the occasion to deplore the absence of similar memorials in America to inspire youth with ambition—a grievance which the American Surgical Association so widely and generously removed after the death of Gross by erecting in Washington a statue to his memory. Syme, Lister, Gross, Keene, Murphy, and many others have had the same inspiring influence as Cooper over their pupils.

THE EDINBURGH SCHOOL OF SURGERY.

The Edinburgh School of Surgery, to which you have paid a tribute in honouring one of its teachers, dates back to 1505, when the Town Council granted the Corporation of Surgeons and Barbers permission to dissect the body of one condemned man in the year. The English Company of Barber-Surgeons did not receive their charter until thirty-five years later. The oldest minute-book in the possession of the Edinburgh College of Surgeons contains, on its first page, a prayer by the famous Scottish reformer, John Knox, and I will quote it, as it has since been read by the Secretary at the opening of every meeting of the College:

> *"O eternal God, and our loving and mercifull Father in Christ Jesus, seeing we are conveenit heir to treat uponn these things that concernis our calling, we beseik thee, O Lord, to be mercifull to us, and giff us grace to proceid thereintill without malice, grudge, or partialitie; sua that the things we may do may tend to the glorie of God, the weill of our vocation, and confort of every member of the samen; throw Jesus Christ, our only Lord and Saviour; Amen."*

The next step in the evolution of the Edinburgh School consisted in the creation of the museum of the college, which is one of the finest collections in Europe. In 1703 the Incorporation of Surgeons erected an anatomical theatre, and two years later Robert Eliot was appointed first professor of anatomy in the Town's College, which had received its charter from James VI in 1582.

John Monro, a Fellow of the College of Surgeons, whose ambition it was to found a medical school in Edinburgh, sent his son, Alexander Monro, to study anatomy and surgery in London, Paris, and Leyden. In 1720 Alexander Monro was appointed to the chair of anatomy; a few years later (1725) he transferred his teaching to the University, and the following year saw the establishment of a Medical Faculty. Of Alexander Monro primus it can truly be said that he was "the father of the Edinburgh Medical School," and, although he was more anatomist than surgeon, Edinburgh surgery owes him an everlasting debt of gratitude for being the moving spirit, along with Lord Provost Drummond, in founding the Royal Infirmary, which soon developed into one of the most famous schools of clinical teaching in the world.

Previous to the establishment of a Faculty of Medicine in the University of Edinburgh anatomy had been taught

by private lecturers belonging to the Incorporation of Surgeons. These men were really the pioneers of the Edinburgh Extra-mural School.

What is now known as the Old Royal Infirmary, where Lizars, Fergusson, Liston, Syme and Lister did their epoch-making work, was opened in 1741. It contained 228 beds, and a single operating theatre accommodating 200 students.

Before 1833, when Syme became Professor of Clinical Surgery in the University, the Edinburgh School of Surgery was rendered famous by Benjamin Bell, whose *System of Surgery*, in six volumes, was translated into French and German, and by the brothers John and Charles Bell, the former a great surgeon-anatomist, and the latter also an epoch-making physiologist, his discovery of the functions of the spinal nerve roots entitling him to rank second only to Harvey. Charles Bell migrated to London, to return to Edinburgh later as Professor of Systematic Surgery. While in London he taught anatomy at the well-known Great Windmill Street School, where he accumulated a number of valuable specimens, now in the Museum of the College of Surgeons of Edinburgh. Both he and his brother John were endowed with great artistic talent, and Sir Charles Bell's water-colour drawings of gunshot wounds, the result of his experience at Waterloo, are classical.

The fame of the Edinburgh School of Surgery in the first half of the last century was largely due to the surgeon-anatomists of the extra-mural school. Principal Sir Alexander Grant, in his historical volume entitled *The Story of the University*, gives full credit to the important part played by the extra-mural lecturers in the evolution of the Edinburgh Medical School, and remarks that

"One of its greatest advantages has been that the University has continued to be surrounded by extra-mural rivals who have kept its professors up to the mark and sometimes eclipsed them, and who have always been in training to fill up the ranks of the University whenever vacancies occurred."

My colleague, Mr. Miles, in his admirable little book on *The Edinburgh School of Surgery before Lister*, makes the further observation that—

"In another direction, the extra-mural teachers have played an important part in guiding the destinies of the medical school. Free from the bonds of statutes and ordinances, they have always been able to lead the way into developing instruction in special branches of knowledge, and many of the specialists that are now represented within the University originated in the extra-mural school."

The chair of Clinical Surgery, which I have now the honour to occupy, was founded by George III in 1803. The first occupant was James Russell, who enjoyed the intimate friendship of Sir Walter Scott. On his resignation Liston and Syme contested the vacancy. The latter was appointed, and became the greatest teacher of his generation. He died in 1870, shortly after his son-in-law, the immortal Lister, who succeeded him, had initiated the new era in surgery.

A few years later Robert Liston accepted the chair of Clinical Surgery at University College Hospital, London. He was perhaps the most famous of all the anatomical surgeons in the Edinburgh school. Before he was appointed to the staff of the Edinburgh Royal Infirmary he was performing, with the assistance of Syme, operations more formidable than those which were undertaken in the Infirmary. He is well known to us all as the introducer of the transfixion method of amputation, and as being the surgeon who performed the first major operation in London under ether, in 1846; it was an amputation through the thigh. There was a dispute between the time-keepers as to whether it took twenty-five or twenty-eight seconds to remove the limb. The patient was in the operating theatre only five minutes. Liston's remark as the patient was leaving the theatre was, "This Yankee dodge, gentlemen, beats mesmerism hollow."

Lizars, who was appointed professor of surgery in the College of Surgeons of Edinburgh in 1831, is well known in America as being the first surgeon in Great Britain to perform the operation of ovariotomy, which had been introduced by MacDowell. MacDowell had sent a copy of his first paper to his old teacher, John Bell of Edinburgh, who was then ending his days in Italy. The paper came into the hands of Lizars, who was also a pupil of Bell's.

Of all my predecessors, however, the immortal Lister stands out pre-eminent, and I refer to him with the deepest humility, as I am only too conscious of my inability to maintain the great traditions which he created in the Edinburgh School. The very Rev. Dr. Wallace Williamson, Dean of the Thistle and minister of the historic Cathedral of St. Giles in Edinburgh, has contributed to the history of medicine a most beautiful and life-like word portraiture of Lister, and I rejoice to think that it will become immortalized by Garrison in his splendid work on the *History of Medicine*, a volume of immeasurable educational value and one which should occupy a foremost place in the library of every member of our profession. Williamson said:

"Of Joseph Lister's winsome personality, those speak most warmly who knew him best. It was his gentleness, above all, that made him great. His very presence was a spiritual force. Clear-eyed and pure of soul, he cherished from earliest days that love of truth which guided him to the end. His noble passion for humanity extinguished all thoughts of self and personal fame, impelling him along that path which he steadfastly pursued till he found the greatest secret of his search and bestowed on the world probably the greatest boon which science has been able to win for the physical life of mankind. Yet greater than his greatest achievement was the man himself, and the final secret of his greatness was that serene simplicity which was his most distinguished characteristic. . . . His was the grave and thoughtful courtesy which bespoke the Christian gentleman and the earnest lover of his kind. Hence we are not surprised to learn how he stirred enthusiasm and moved men to reverence, how he gained such love and affection as rarely falls to a scientific teacher. Behind his acknowledged mastery of his science, his grave and noble face, marked by soft lines of tranquil thought, revealed a soul of singular beauty and sweetness, of high integrity and stainless honour. That such a man, dowered with God's gift of genius, should rise to the lofty heights and achieve great things was inevitable."[1]

Although the last century saw the end of the purely anatomical era of surgery, I have no hesitation in bringing into the foreground the prominent part which the great surgeon-anatomists of my school have taken in the evolution of surgery. The medical curriculum is now so overcrowded that the medical student, while he may be more spoon-fed with anatomical details, does not acquire the same dissecting-room knowledge of anatomy that was possessed by the student of my day. The dissecting room is the surgeon-probationer's basic laboratory. My advice to all my house-surgeons who wish to take up surgery as their life-work is to go back to the dissecting room and teach practical anatomy for at least one year. This is not only good for himself, for surgery, and for his patients, but it is an advantage also to the dissecting room, as it supplies it with demonstrators who can appreciate and point out the bearing of anatomical details and topographical relations on the practice of surgery.

It has been said that a weak point in the training of the young American surgeon of the present generation is his deficient knowledge of morbid anatomy and morbid histology, and that he too often feels the need of a pathologist at his elbow in the operating theatre. Personally, I am always grateful that early in my career I devoted time to the study of surgical pathology. For two years following my house-surgeonship I was a whole-time demonstrator of anatomy, and for the succeeding nine years, during which I taught surgical anatomy, I had charge of the pathological laboratory in connexion with the chair of systematic surgery then occupied by Professor Chiene. In this capacity it was my duty to give demonstrations in surgical pathology to his class, and to examine and report upon all material derived from his wards. The surgeon of to-day cannot be regarded as fully trained unless he himself is pathologist enough to be able to assess the significance of the naked-eye and histological appearances of the tissues and organs with which he has to deal. Only exceptionally should it be necessary for the surgeon to have to interrupt his operation until the pathologist has made a lightning histological examination on the "while-you-wait" system.

The last half-century has begun a new epoch characterized by an ever closer alliance between the basic sciences of physics and chemistry with physiology and pathology, and the closer application of all of them to the practice of

[1] Rev. Wallace Williamson: British Medical Journal, 1912, vol. i, p. 444.

surgery. The chief pioneers of this new era were Kocher and Horsley, and for the present stage of its evolution we are indebted to the brilliant researches of such men as Cushing, of Carrel, of Crile, and of Plummer and Kendall of the Mayo clinic—in short, to the American school of surgery.

The problem before surgeons to-day is, "How is this more scientific and enlightened conception of surgery to be encouraged and promoted?" The question is of the greatest importance from the academic point of view. In the first place we must not merely rearrange the time-table of the curriculum; we must also reform and co-ordinate the teaching in such a manner that the student may be shown how to apply his knowledge of the basic sciences to the investigation and treatment of disease—in other words, to his clinical work.

In Edinburgh, in addition to the senior Professor of Chemistry, we have a second Professor of Chemistry in its relation to medicine, whose teaching is specially adapted to their future requirements, and the same applies to the teaching of physics to the medical students. Botany and zoology must of necessity be taught in the Faculty of Science as separate sciences; it is, however, to be hoped that in the near future the medical student will be given a combined course of animal and vegetable biology, and that the syllabus will be drawn up on such broad and fundamental lines as to ensure that the course will provide him with the best possible foundation for his future studies. It is quite possible that the ideal professor for such a purpose does not exist, and that he will require to be created and specially trained for the purpose. It is a man of the type of the late Professor Huxley that is wanted. It is to be hoped that the teaching of physics and chemistry in the secondary schools will soon reach such a high standard that these subjects may be relegated to the university entrance examination; otherwise the medical curriculum will have to be still further extended.

Edinburgh now as in years past holds the record for undergraduate medical education. While her machinery is specially constructed for this purpose, her 1,800 medical students seriously handicap her in providing facilities for post-graduate clinical work.

It is lack of funds which is sadly crippling us in respect of facilities for original research, and unless the money is forthcoming for the institute we hope to erect as a memorial to Lister, and for which we are at present making an appeal, I am afraid Edinburgh will not be able to pull her full weight. The existing University laboratories are already heavily taxed with the work necessary to keep up the high standard of undergraduate teaching.

THE AMERICAN COLLEGE OF SURGEONS.

The constitution of the American College of Surgeons shows that the best surgeons of America intend to translate their ideals, their vast energies, their intellect and wisdom into terms of united action for the good both of the guild and of the community. The destiny of the College is in the hands of men who are known throughout the surgical world, men who have travelled and made themselves familiar with the organization of the ancient surgical corporations and the surgical schools of Europe. They start with a clean slate, unhampered by tradition. True, we have undertaken a gigantic task, such as only Americans would have the courage to venture upon, but when I read the names of the Governors and Regents I am confident that their efforts will be crowned with success. No one can sign the pledge of your College without a sense of responsibility being aroused within him. I feel sure, however, that every honest and conscientious surgeon must admit that, in signing it, he is pledging himself to do no more than is his duty to himself, to his profession and to the community.

A point which specially arrested my attention on reading the by-laws was the "interchange of opinion" and "attendance on the important societies and clinics." Surgeons of the individualistic type, who are content to confine themselves to the knowledge gained by their own exclusive experience, can only reach a certain standard of efficiency, and, while it must be admitted that a few reach a high standard, it is safe to say they have done so in spite of their self-sufficiency, and not because of it. That they would have ranked still higher in the surgical world had they been willing to learn from others, everyone will, I think, admit.

Perhaps the most striking clause in the laws of the College is the admission to your Fellowship without examination. This departure from precedent was not only justifiable, but, in the circumstances, necessary. Experienced examiners on my own side of the Atlantic have for long felt that the admission of candidates to our Fellowship by the methods of examination at present in vogue is open to serious criticism. It by no means follows that because the candidate has passed the examination he is competent to perform major operations. It is to be hoped that the bold, enlightened, and sagacious step which your College has taken will encourage our own colleges to take further, and possibly similar, precautions to see that candidates who obtain our Fellowship are worthy of this distinction. Whether you obtain sufficient evidence that your successful candidate possesses an adequate knowledge of anatomy and pathology is the only criticism I would venture with regard to your present system.

The first impression one might gain after reading the Constitution and By-laws of the American College of Surgeons is that they have been framed in such a way that the governing body is vested with an authority and with disciplinary powers which might be said to interfere somewhat with the liberty of the subject. Even if we admit that there is a certain amount of truth in this impression, it must be remembered that the profession has a duty, both individually and collectively, not only to its own guild but to the community it serves. It may safely be asserted that in no walk of life, in no other profession, and in no other branch of our profession is the life of the subject so much at the mercy of his fellow-man as when he places himself in the hands of the surgeon. It is only right and proper, therefore, that the profession itself should see to it that a trust so sacred and a weapon so powerful for good or evil, should be placed in the hands of men who have shown that they are morally as well as intellectually and technically capable of fulfilling the trust. In America these powers have been vested in a Council of Regents and an Executive consisting of men of the highest integrity, of great experience, and of powerful intellect—men who combine great foresight and sagacity with sound judgement, men who can think as able administrators as well as function as great surgeons. Such combined effort is calculated to secure a fine and accurate adjustment of the activities and functions of the surgical profession.

It was the war—a war of science—which brought very forcibly before us what may be accomplished by properly combined and co-ordinated effort fortified by authority and discipline. The peace which has followed has created the opportunity and the necessity for breaking away from tradition, for readjustment, and for reconstruction. The phenomenal progress which surgery has made during the present generation and the added knowledge gained through the war has made it all the more imperative that surgery should set its house in order. The surgical world is grateful to America that she has taken the initiative in combining and co-ordinating her surgical forces with the object of raising the general standard of surgery not only in its academic centres but in the hospitals throughout the States. What is needed is co-operative thought transformed into co-operative action. These basic aims have evidently been in the minds of those who drew up the Constitution and By-laws of your College. By vesting the general management of your corporation in a board of fifty governors who shall select fifteen of their number, along with the president for the year, to form a Board of Regents in whom shall be vested the details of management, and by choosing from the Board of Regents an executive committee consisting of the president, the secretary, the treasurer, and five other Regents, the College has created a powerful "thought-organization" capable of originating and carrying out an enlightened and far-reaching policy.

The moulding, the development, and the improvement of the standard of hospitals is one of the most important pieces of organization and propaganda work that your College could undertake. By placing your expert knowledge and experience at the service of the American Hospital Association you secure a unity of thought and purpose which cannot fail to have great influence upon

public opinion and ensure the co-operation and sympathy of the municipal authorities as well as open the purse-strings of well-to-do citizens. It is important that the lay public be made to see that, after all, the hospital is the surgeon's schoolroom, and the better it is equipped the better will be the training of the surgeon and the better the treatment of the citizen.

Hospital Organization in Britain and America.

The systems of hospital organization in Great Britain and America differ very materially. In my own country all the large teaching hospitals—indeed, the large hospitals generally—are supported almost entirely by voluntary contributions, so that each hospital has its own organization and method of administration. There is no attempt at combined effort with a view to standardization, and it cannot be said that we have done anything to encourage architects to specialize in hospital construction or to create a body of expert hospital superintendents.

Our own hospital system has recently been the subject of a parliamentary inquiry. The Committee has reported in favour of a continuance of the voluntary system, but it is doubtful how long this system will survive under the present burden of taxation. The municipal authorities will certainly be against placing our large hospitals on the rates. While our hospital system is excellent from the point of view of the working classes, it does not meet the requirements of the middle-class population in the way that the American system does; that, however, may I venture to suggest, has two defects which I feel sure the American Hospital Association will be able to remedy without calling in the aid of the State, or, I should say, without the interference of the State. I refer, firstly, to the rotation system of a three or four months' service of general practitioners on the staff of the surgical side of hospitals; and, secondly, to the system whereby facilities are given to practitioners of little or no surgical experience for operating on their private patients in public or semi-public hospitals. These two customs may in great measure be responsible not only for the relatively larger amount of surgery done by general practitioners in America, but also for a tendency to the commercialization of surgery.

In my own country we are inclined to go to the other extreme. The want of proper hospital accommodation for our middle classes sometimes compels us to operate on patients in their own homes or in imperfectly equipped nursing institutions. While it may occasionally be necessary for a good surgeon to operate under unfavourable conditions, his conscience ought to dictate that he should only give the patient his second best when it is impossible to do otherwise.

Specialization in surgery should not be discouraged provided it is preceded by a good general training in surgery. It encourages intensive work in those with special aptitudes; the work itself is better done, and an added zest for it is created. A fine adjustment of task to individual aptitude is an economy of effort and applies not only to modern surgery but to modern education generally.

I think I am correct in stating that it is just forty years since the Harvard Medical School instituted a department of orthopaedic surgery, and I am sure my American brethren will be surprised to hear that no such department exists in the Edinburgh Royal Infirmary. Thanks to the genius and magnetic influence of Sir Robert Jones, assisted by a band of orthopaedic experts from America, this branch of surgery did outstanding work during the war; indeed, it furnished, perhaps, the best example of what may be achieved by able generalship, good organization, and co-ordination of combined effort and team work.

It is to be hoped that the lesson to be learned from the orthopaedic experience and achievements during the war will bear fruit, and that, by the establishment and proper equipment of an orthopaedic department in our teaching centres, the standard of the surgery of the extremities will rapidly improve. We envy America her public spirited citizens who subscribe with such open-handed generosity to every kind of educational institution. The Edinburgh Royal Infirmary, with its 900 beds, which serves not only a national but an imperial purpose from an educational point of view, and draws its patients not only from Edinburgh and district, but from a large part of Scotland as well as from the north of England, has recently issued an appeal for £250,000 with the object of meeting the requirements for the teaching and practice of modern medical science. So far the Edinburgh appeal has brought in only £63,000, all of which will be required to improve and maintain the existing departments. Unfortunately, Scotland is only a small and relatively poor country, with no millionaires, and I am sorry to say the chairman of the Finance Committee, who is fully alive to the necessity of establishing a Chair of Orthopaedics in our great medical school, tells me that it cannot be done—unless some Scotsman who has amassed wealth overseas can be persuaded to come to the rescue.

Already America has done pioneer work in establishing a proper system of preserving and cataloguing case-records. In this way an analysis and review of immediate statistics can from time to time be obtained, and, if the College of Surgeons can help to establish a definite and more standardized follow-up system, such as exists in Boston, Rochester, Baltimore, Cleveland, and elsewhere, statistics of real value will be obtained. In the Edinburgh Royal Infirmary, while the cases are well "taken," each unit retains its own records, and I regret to say there is no central bureau where they are subsequently stored and indexed, so that, up to the present, no attempt has been made to make use of them for statistical purposes. This is a serious defect in an institution which has taken such a prominent part in medical education for more than three centuries.

The possibilities which your College affords for organization and prosecuting a systematic, collective investigation, not only into immediate and end-result of operations but also into the value of various other measures employed in surgical therapeutics, are very great. Think, for example, of the benefit which would accrue from a collective investigation into the value of radium and x rays as therapeutic agents in the treatment of malignant disease. With the machinery for organization which your College possesses, the untold wealth of material at its disposal, and the reliable observations which could be guaranteed, I am convinced that in this line of investigation America would again lead the world. Science is ever becoming more and more international. America has taken more advantage of this cosmopolitan spirit than we Britishers, and in my judgement this is the main reason why the sceptre of surgery is to-day wielded by America.

British surgeons will, I feel confident, rejoice that you have taken Canada into partnership with you in founding your College. The next step, I trust, will be a closer alliance with British surgery. I am thankful to say that at last we have formed an Association of Surgeons of Great Britain and Ireland, having the same ideals and aims as the American Surgical Association, and it is to be hoped that these two bodies will form the beginning of an intimate English-speaking surgical brotherhood which will help to promote every object calculated to advance the progress of the science, the art, and the teaching of surgery, and the relief of human suffering. Science, and especially medical science, recognizes no frontiers; it is the most powerful agent we possess for welding together our two nations—a union which would go far to ensure the peace, happiness, and prosperity of the world.

I cannot do better than conclude with the words used by Sir Berkeley Moynihan, an Honorary Fellow of your College, who, as you all know, is not only a great surgeon, but is also an inspiring writer and orator: "In presenting you with the mace I see before me," he said, "we pray God may regard it as a symbol of our union in the harsh days of trial, as a pledge of unfaltering and unchanging hope that the members of our profession in the two lands shall be joined in brotherhood for ever in the service of mankind."

The new buildings of the medical school of the University of Alberta, Canada, have been completed and the equipment transferred to them.

An Eyesight Conservation Council of America has been incorporated, with headquarters at the Times Building, New York; its objects are to arouse public interest to a proper appreciation of eye hygiene, especially as it pertains to defective vision and protection in hazardous occupations.

THE SCIENCE COMMITTEE
OF THE
British Medical Association.

AN INVESTIGATION INTO THE CIRCULATION THROUGH THE LUNGS.

BY

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[*Preliminary Report.*]

Introduction.

The importance of the pulmonary circulation is seen in the serious effects which ensue when it is interfered with in any way; this interference may be a consequence of disease of some part of the blood vascular system itself, or may result from conditions which are present locally in the lungs or pleural cavities, thus directly affecting the pulmonary system. In the first group may be cited pulmonary embolism; in the second, pneumonia, pleural effusions, etc.

It was thought that the adaptability of the pulmonary circulation could be tested by imitating in animals, as far as is possible, the condition of embolism of one main branch of the pulmonary artery as it occurs in man. Any conclusions reached might throw a new light on the circulation in the lungs during collapse or consolidation.

In man a large pulmonary embolus frequently causes sudden death, apparently from cardiac failure; or the symptoms may be prolonged for some hours before death ensues; or finally recovery may occur. Apart from the heart failure, the symptoms are ascribed to insufficient oxygenation of the blood, with its consequent effects on the central nervous system and the heart itself.

Part I.—Ligature of One Main Pulmonary Branch in Animals.

This condition of a large embolus was imitated, as far as possible, by ligature of one pulmonary artery.

The animals used were cats: in some ether was the anaesthetic throughout; in others the preliminary operative procedures were done under ether, and later urethane was substituted for it. Usually the chest was opened in the mid line, both pleural cavities being exposed; the pericardium was also slit up. In some of the later experiments, however, in which the chest was closed again, only the left pleura was opened by cutting through a few costal cartilages on this side; the left pulmonary artery was then reached by a small incision through the pericardium over it.

The carotid blood pressure was recorded in the usual way, and the pulmonary by means of the four-way cannula introduced by Sir E. Sharpey Schafer. This is inserted into the right ventricle and tied in by a purse-string suture. The cannula proper projects through the pulmonary valves into the stem of the pulmonary artery. The whole instrument and its connexions are filled with a 3½ per cent. sodium citrate solution, and the pressure recorded by a manometer containing the same fluid. If a piston recorder is connected to the top of the manometer tubing the pressure can be recorded graphically.

Natural respirations were recorded by a thread from the upper abdominal wall to a lever writing on the drum, and artificial ventilations by means of a bellows recorder, connected to a by-pass on the tube between the pump and the tracheal cannula.

In the experiments on cardiac output a glass cardiometer was used, connected with a piston recorder. The saturation of the blood with oxygen was estimated in a 1 c.cm. Barcroft differential blood-gas apparatus. The left branch of the pulmonary artery was that ligatured as it is the more superficial and can be easily reached.

A.

The general effects of ligature of the left pulmonary artery were studied in animals with the chest open under artificial ventilation.

The immediate effects are surprisingly few. There is no alteration in the carotid blood pressure (except sometimes an oscillation from mechanical interference with the heart when the ligature is pulled taut). There is no alteration in the rate of the heart, in its output, nor in its state of dilatation. The only noteworthy result is a rise in the pulmonary blood pressure; this is immediate and varies in amount in each case from 25 to 60 per cent.—usually about 40 per cent.—of the original pressure in the pulmonary artery.

The later effects depend partly on the amount of ventilation the animal is receiving. A slow rise in the carotid blood pressure indicates deficient oxygenation, and can be compensated by increasing the ventilation; thereafter the pressure remains steady or shows a continuous fall as the experiment proceeds.

The pulmonary blood pressure remains at about the same level for a varying time (25 to 40 minutes); it then shows a gradual fall, which is usually not so marked as the accompanying fall in the carotid blood pressure; sometimes, however, the pulmonary falls more than the carotid pressure (relatively). It is possible this signifies a further dilatation of the pulmonary arterioles.

If the ventilation is insufficient, the initial rise of pulmonary blood pressure may be followed by a further rise together with the rise in carotid pressure, both then falling when the ventilation is increased.

Experiment A.—*Cat: Ether: Chest Open: Artificial Ventilation. Ligature of Left Pulmonary Artery: its Effect on Carotid and Pulmonary Blood Pressures.*

Time.	Remarks.	Carotid Blood Pressure in mm. Hg.	Pulmonary Blood Pressure in mm. Hg.*
p.m. 3.0	—	73	18.5
	Left pulmonary artery ligated	72	26.0
3.1	Ventilation increased to 1½ times	74	27.0
3.2	Increase in ventilation only 1½ times	67	25.0
3.11	Ventilation doubled	60	23.5
3.34	—	64	21.0
3.47	—	64	20.5
3.48	Ligature unloosed. Ventilation reduced to normal	60	18.5
3.51	—	70	17.0

* To nearest 0.5 mm.

Experiments were performed to control all the above results. The output of the heart, which was unaltered when the ligature was applied, increased markedly to an injection of gum saline intravenously, as did its state of dilatation; at the same time the rate of beat increased.

Experiment B.—*Cat: Ether: Chest Open: Artificial Ventilation: Heart in Cardiometer. Ligature of Left Pulmonary Artery: its Effect on the Output of the Heart.*

(The ventilation was the same throughout.)

Time.	Remarks.	Output of Left Ventricle per Beat in c.cm.	Carotid Blood Pressure in mm.Hg.	Pulse Rate per Minute.
p.m. 12.51	—	1.5	92	192
12.52	Left pulmonary artery ligated	1.5	92	192
12.53	—	1.5	88	192
12.55	—	1.5	86	192
12.58	—	1.4	86	192
	25 c.cm. gum saline injected intravenously; heart dilated	1.85	92	210
12.59	—	1.8	84	210

The effects of alterations in ventilation on the circulation were carefully studied. It was found that increasing or decreasing the ventilation, within normal limits, had no effect on the rate of the heart, or its output, and very little effect on either the carotid or the pulmonary blood pressure.

EXPERIMENT C.—*Cat: Ether: Chest Open: Artificial Ventilation: Heart in Cardiometer: Effect of Alterations in Ventilation on Pulse Rate and Carotid Blood Pressure.*

(The output remained constant throughout.)

Ventilation.	Pulse Rate per Minute.	Carotid Blood Pressure in mm. Hg.
Normal...	192	87
Increased × 2	192	80
Diminished to ½	186	85
Diminished to ¼	186	86

On the other hand, excessive ventilation had a mechanical effect in causing a small rise in pulmonary pressure and a fall in carotid pressure, while the reverse occurred to diminished ventilation. Apart from the mechanical effect, the result of alterations in ventilation depended on the previous amount of ventilation; when the latter was normal there was (within limits) no change of blood pressure; but if the ventilation had been insufficient and the pressures were rising, increasing it led to a coincident fall in both. It was shown that the increase in ventilation in experiments with the left pulmonary artery tied, necessary to keep the carotid blood pressure steady, was within the normal limits, and had only a trifling effect on the blood pressures in a control experiment.

EXPERIMENT D.—*Cat: Ether: Chest Open: Artificial Ventilation: Effect of Alterations of Ventilation on Carotid and Pulmonary Blood Pressures.*

Time.	Ventilation.	Carotid Blood Pressure in mm. Hg.	Pulmonary Blood Pressure in mm. Hg.*
	Normal	69	17.0
Zero	Increased by 1½ times		
1 min.	„ „	65	16.5
	Increased by 1½ times		
2 min.	„ „	62	15.0
3 „	„ „	60	14.0
4 „	Normal	60	14.0
4½ „	Normal	65	15.0
5½ „	Normal	68	15.5
	Diminished to ⅔		
6 min.	„ „	69	16.5
	Diminished to ½		
6½ „	„ „	73	17.0
	Normal		
10 min.	Normal	73	18.5

* To nearest 0.5 mm.

Occasionally the carotid blood pressure showed a fall on ligature of the left pulmonary artery; this was only seen in animals in poor condition, and indicated that the heart was unequal to the strain put upon it.

It is obvious from these results that the healthy right ventricle can send out the same quantity of blood in a given time through one lung only as it was sending out previously through both, and thus maintains the carotid blood pressure at the same level. The increase in pressure in the pulmonary artery was never more than 60 per cent. of the original pressure; hence there must be a dilatation of the right pulmonary arterioles and capillaries at the same time as the rise in pressure, if twice the original volume of blood is to flow through the one lung in a given time. The velocity of blood flow will therefore be increased but not doubled.

It was of interest to investigate the saturation of the blood with oxygen under these conditions. It was found that it was quite possible for the blood to be 90 to 95 per cent. saturated, provided sufficient ventilation was being given. If the blood was more unsaturated than this, increasing the ventilation would improve its saturation. The increase necessary was within the normal limits—that is, it caused not more than a trifling alteration of carotid blood pressure.

The fact of the pulse rate remaining unaltered on ligature of the left pulmonary artery, although the pulmonary pressure rose, suggests that the right ventricle is not provided with a mechanism comparable to that on the left side, which causes slowing of the heart with rise of blood pressure. At any rate, it is clear that the healthy heart shows no difficulty in meeting the extra strain put upon it.

In some experiments the ligature was released after a variable time; the carotid blood pressure was generally unaffected by this procedure unless there was mechanical interference with the heart. In a few cases, when the ligature was taut for a short time only, the reverse effect to that seen on tying was observed. In the case of the pulmonary blood pressure, however, there was always a fall; which was usually to the same, or nearly the same, figure as obtained before the ligature was tied. If, however, while the ligature was on the pulmonary blood pressure had fallen, there was still a further fall on its removal. This fall was smaller relatively than the rise on ligation (see Experiment A above).

The blood saturation improved somewhat when the ligature was removed, but not so much as might have been expected. The saturation was 80 per cent. to 90 per cent. (with normal, not increased, ventilation). This presumably indicates damage to the left lung, or deterioration of the animal during the course of the experiment.

B.

A further series of experiments was performed, in which, after the left pulmonary branch had been ligated, the chest was closed and the artificial ventilation withdrawn, the animal being allowed to breathe naturally.

The effect of closure of the chest on the blood pressures was first determined in a case with an intact pulmonary system. It was found that both were slightly lower with the animal breathing naturally than they had been under artificial ventilation with the chest open: if now with the chest closed, artificial ventilation was put on, the pulmonary blood pressure showed a small rise, and on opening the chest again there was a further rise in this, accompanied by a rise in carotid blood pressure. These effects can be explained as due to the pressure inside the chest: with natural respiration this is negative, leading to dilatation of pulmonary arterioles, and possibly other blood vessels; with positive artificial ventilation these arterioles are compressed, causing a small rise of pressure.

EXPERIMENT E.—*Cat: Ether: Effect of Closure of Chest on Blood Pressures.*

Remarks.	Carotid Blood Pressure in mm. Hg.	Pulmonary Blood Pressure in mm. Hg.
Chest open: artificial ventilation ...	82	13.7
Chest shut: natural respiration ...	75	10.7
Later	80	11.1
Chest shut: artificial ventilation ...	80	13.3
Chest opened: artificial ventilation	90	14.4

When the left pulmonary branch has been tied and the chest closed, the blood pressures may remain steady, or show a small fall (probably due to the operative procedures). This fall tends to be recovered from, and often there is a very distinct improvement in the animal's condition after time has been allowed it to settle down.

At present the most satisfactory results have been obtained in animals which have only had a minimum of operative interference, such as the ligature of the left pulmonary artery through an opening in the left chest, by cutting through four rib cartilages, without opening the right pleural cavity at all, or the pericardium more than is necessary to enable the ligature to be put round the artery. If, on the other hand, the chest has been widely opened and a pulmonary cannula also inserted, it has so far been found that the animal is unable to breathe properly when the chest has been closed. In the earlier experiments it was ascertained directly that there was a

negative pressure in the thorax after closure of the chest, by means of a cannula communicating with the pleural cavity and connected to a water manometer. In later experiments this has been dispensed with; the lungs are blown out before the last suture is drawn taut, and, when the animal is breathing naturally, the chest is auscultated to see that air is entering the lungs.

In cases which survive the respiratory rate is quicker than normal, usually about double, but the respirations have a tendency to be shallow. Sometimes, however, they are normal in rate and depth.

Animals can be kept alive for at least six hours after closure of the chest, and with the left pulmonary artery ligatured, in perfectly good condition, with a blood pressure of 90 to 100 mm. Hg or more. The pulse rate remains fairly constant throughout or may show a slight retardation after the chest is closed.

It is of considerable interest to compare the oxygen saturation of the blood under these conditions with the results found (and previously mentioned) as obtaining in cases where the chest has not been closed and the animal has been artificially ventilated throughout. A considerably lower degree of saturation has been found, when the animal is breathing naturally; the blood is usually only 70 per cent. to 75 per cent. saturated, in spite of the increase in the respiration rate.

Investigation into this question is, however, still proceeding.

EXPERIMENT F 1.—*Cat: Ether: Ligature of Left Pulmonary Artery through a Small Incision through Left Thoracic Wall near Mid-line, and Closure of Chest again.*

Time.	Remarks.	Carotid Blood Pressure in mm. Hg.	Pulse Rate per Min.	Respiration Rate per Min.
a.m. 11.40	Control observations	100	198	32
p.m. 12.3	Chest open: artificial ventilation	100	—	—
	Left pulmonary artery ligated	—	—	—
12.7	——	108	—	—
12.24	Chest now closed: natural respiration	85	132	48*
12.45	——	75	120	37†
1.25	——	95	—	34
2.3	——	120	144	26
3.15	——	120	210	34
	Killed by asphyxiation			

* Depth to 1½ normal. † Depth normal.

EXPERIMENT F 2.—*Cat: Ether and Urethane.**

(Experimental procedures and observations similar to F 1.)

Time.	Remarks.	Carotid Blood Pressure in mm. Hg.	Pulse Rate per Min.	Respiration Rate per Min.
a.m. 11.30	Control observations	78	216	48
12.0	Chest open; artificial ventilation	72	216	—
p.m. 12.3	Left pulmonary artery ligatured	64 rising to 74 in ½ min.	—	—
12.12	Chest closed; natural respirations	88	216	94
1.23	——	85	—	96
2.0	——	90	216	96
3.15	——	95	192	72
4.3	——	90	204	72
5.42	——	82	192	66
5.45	Both vagi cut	88	—	28
5.50	——	88	—	12
	(Killed)			

* Atropine 0.016 grain given hypodermically at commencement.

C.—*The Condition of the Lungs.*

Post-mortem examinations of the lungs were always made, and frequently pieces taken between ligatures for section, both during the course of the experiment and at the end.

All cases showed very similar appearances. After ligature of the left pulmonary artery, and while the chest is still open (artificial ventilation), the left lung is obviously paler than the right, and also paler than it was before the ligation. Microscopic sections show an almost complete absence of blood in the capillaries and arteries, although some can still be seen in the veins. At the same time the right lung contains more blood than normal, since twice the usual quantity is flowing through it in a given time. In the case of the left lung the squeezing effect of the positive inflation, together with the stopping of the blood flow, is sufficient to force the greater part of the blood out of it.

If, now, the ligature is removed, the circulation is re-established through the left lung, but at the same time oedema occurs in the alveoli, showing that damage has been done by the stoppage of the blood flow.

When the chest has been closed and the animal has breathed naturally—the pulmonary capillaries thus being exposed to a negative intrathoracic pressure—the appearance, *post mortem*, of the right lung is not greatly altered from that previously described, but the left lung presents a very different picture, being full of blood and frequently congested.

Since the ligature has always been taut, *post mortem*, there are only two possible sources for this blood—the bronchial arteries or the pulmonary (and bronchial) veins. It was thought that under a negative pressure, and with expansion of the left lung to the respiratory movements, blood might be sucked back from the left auricle into the lung, producing a stagnant collection of blood and so impairing the general condition.

Experiments were performed to determine between these two possibilities. If the left pulmonary veins are ligatured just before they enter the left auricle, after the left pulmonary artery has been tied, and the chest closed in the usual manner, the left lung is found intensely congested after death. Microscopically, a condition of engorgement is found, such as has been seen in no other cases; it is obvious, therefore, that a considerable circulation exists from the bronchial arteries, and that the blood they bring to the lung is unable to return in its entirety through the bronchial veins, a great part of it being returned normally via the pulmonary veins.

On the other hand, if all the structures going to a lobe of the left lung are tied except the veins and bronchus, that lobe remains fairly free of blood compared to the other lobe, even although the latter has its pulmonary artery ligated.

Presumably, therefore, the blood found in the left lung *post mortem* after the left pulmonary artery has been tied, comes from the bronchial arteries. In most experiments there seems to be more blood in the left than in the right lung, but in a few the reverse is the case. Since the communication between the bronchial arteries and pulmonary system is one of capillaries only, the blood which is not returned via the bronchial veins filters through into the pulmonary capillaries under a very low pressure, which is not sufficient to force it onwards into the veins in any quantity, thus leading to congestion.

All the lungs show mucus in the bronchi to a greater or less degree, even after a previous injection of atropine subcutaneously. The right lung has shown no oedema, except in the case of an animal which has lived for about six hours; the amount present then is, however, small and insufficient to cause death. As a matter of fact, this animal appeared in quite good condition when it was killed. This oedema of slow development is probably due to the fact that double the normal amount of blood is flowing through the right lung in a given time (under a pressure slightly higher than the normal).

PART II.—EXPERIMENTS WITH RIGHT BRONCHUS OBSTRUCTED.

In the second series of experiments the right bronchus was clamped or tied, and a similar set of observations made to those reported in the first series.

Ligature of Right Bronchus.

The experiment was performed with the chest open and under artificial ventilation. There was no immediate effect on the carotid blood pressure (unless there had been mechanical interference with the heart during the operative procedures, when there was a fall); during the next few minutes, however, it showed a slow rise, which was undoubtedly anoxaemic in origin, and was usually stopped by increasing the ventilation. Sometimes, in spite of full ventilation, the rise was maintained. At other times the carotid pressure was maintained steady, but the effects of the anoxaemia were seen in the fall of pulse rate and increase in the pulse pressure, increasing the ventilation then bringing about the reverse changes.

The pulmonary blood pressure showed a small immediate rise, which might not be maintained, or was merged in a further late rise, accompanying the carotid pressure rise; like the latter, an increase in the ventilation now caused a fall. Sometimes the pulmonary pressure rose independently of the carotid. The saturation of the blood was under 90 per cent. in these experiments, in spite of the fact that the ventilation had been increased. The small rise in pulmonary blood pressure suggests that some circulation is still occurring through the right lung, and this is confirmed by the low blood saturation.

Investigations on the effects of ligature of a bronchus on the pulmonary blood pressure and blood saturation are still proceeding.

SUMMARY AND CONCLUSIONS.

1. Ligature of the left pulmonary artery in cats (with the chest open and under artificial ventilation) causes a rise of pulmonary blood pressure of from 25 per cent. to 60 per cent.—usually about 40 per cent. There is no effect on the carotid blood pressure, pulse rate, output of the heart, or its state of dilatation.

2. The healthy heart therefore can accommodate itself without difficulty to sending the same volume of blood through one lung only in a given time, as it previously sent through both.

3. No mechanism producing slowing of the heart from rise of pulmonary blood pressure was demonstrated in these experiments.

4. If the chest is closed after the artery has been ligatured, the animal remains in good condition—in fact, frequently its condition is improved. Its respiratory rate is usually faster than normal, frequently about double, but the depth tends to be shallow.

5. The saturation of the blood after ligature is about 75 per cent.; if the artificial ventilation is increased (within normal limits), complete saturation can be obtained. This has not been the case, however, with animals in which the chest has been closed and the artificial ventilation discontinued; in these the saturation remains at about 70 per cent.

6. Examination of the lungs shows an increased quantity of blood in the right lung, due to twice the normal volume flowing through it in a given time. The left lung after ligature of the left pulmonary artery, under artificial ventilation, contains almost no blood, except a little in the veins; on the other hand, after the chest has been closed and the animal allowed to breathe naturally, it contains usually more blood than the right lung, exhibiting a varying degree of congestion. This blood comes from the bronchial arteries and stagnates in the pulmonary capillaries.

7. Ligature of the right bronchus (in cats with the chest open and under artificial ventilation) causes a small immediate rise in pulmonary blood pressure without affecting the carotid pressure.

8. The saturation of the blood has always been under 90 per cent., even when the artificial ventilation has been increased.

9. There is, therefore, presumably still a certain amount of circulation through the right lung under these conditions.

Investigation is still proceeding on the following points:

(*a*) The degree of saturation of the blood, after the left pulmonary artery has been tied and the chest closed.

(*b*) The effects of ligature of a bronchus on the pulmonary blood pressure and the blood saturation, since the observations in this series are as yet few.

I wish to thank Professor F. A. Bainbridge for continuous help and advice during the course of these experiments.

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A NOTE ON THE EARLY RECOGNITION AND CORRECTIVE TREATMENT OF OCCIPITO-POSTERIOR PRESENTATIONS.

BY

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IT does not seem to be generally known that for those who have the opportunity to see a case of occipito-posterior presentation in the week before delivery or very early in labour, it is possible to make an exact diagnosis by external palpation and to correct it by external methods. In the application of the routine four hand-grips in palpation the bilateral grip shows the lateral lie of the trunk, and, in addition, the extra facility with which the limbs may be felt may awaken the suspicion of possibly posterior occiput. The exact recognition is then frequently practicable by a modification of the two-handed pelvic grip. The symmetrically laid hands sink directly backwards from the line of the pubic bones, and from the relatively greater sink on one side the oblique diameter in which the head tends to lie may be defined. When the diameter and the side on which the trunk lies are the same, both right or both left, the posteriority is definite. In the next step the hands are again symmetrically placed, but, instead of sinking back from the pubic level, they are withdrawn upwards. The attitude of the head, the extent of its flexion, is shown by the inclination, to the horizontal line of the pubic brim, of the line in which the hands cease to feel the head, the occipito-mental base.

The external treatment is simple and usually successful. A binder is laid under the patient and two towel pads are prepared. The first is rolled to about the thickness of a forearm, the second is folded to a flat pad 6 or 7 inches square. The rolled pad is pinned to the binder in such a position that when the binder is firmly secured the pad will lie close in front of the anterior superior iliac spine behind and parallel to the trunk. The flat pad is pinned so as to lie on the limbs, pressing them backwards. It is sometimes useful to roll the patient to the side opposite the trunk and by hand bring the trunk as far as may be over to that side. The binder is then pulled firmly home. If the patient is actually in labour nothing more may be needed, but if she is still on foot the binder should be steadied by thigh-bands and the correctness of its position frequently supervised. When in bed the patient should be encouraged to lie on the side opposite to the trunk, but her comfort is a prior consideration.

The success I have experienced from this method of treatment is so high that the usually described method of correction by manual reposition from the vagina is now rarely needed. The actual manipulations in this latter replacement are perhaps not personally familiar to some of the writers who describe it. In a very recently issued diagram the operator is shown using his right hand internally and, with obvious gaucherie, the left hand externally in a right occipito-posterior presentation. The correct method of standing on the patient's left side and using the left hand internally is shown by Munro Kerr in *Operative Midwifery*. For a left occipito-posterior case the stand should be on the right and the right hand used internally, when the patient is in the dorsal position.

ACCORDING to the *Deutsche medizinische Wochenschrift* the venereal disease clinics in Berlin were attended by 6,454 persons in 1918, by 22,338 in 1919, and by 23,819 in 1920. The venereal disease clinics throughout Germany were attended by 27,000 persons in 1918, and by 95,000 in 1919.

IN December, 1921, the Société de Médecine de Paris will award the Duparcque Prize of 3,000 francs to the author of the best essay in French on the methods of determining the functional activity of the liver, and their applications to medicine, surgery, and obstetrics. The Guillon Prize of 300 francs will be awarded by the same society for the best essay on diseases of the urinary tract.

PULMONARY TUBERCULOSIS IN AN INFANT.

BY

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THE following case presents points of interest both from the distribution of the lesions and the knowledge of the source of the infection.

The mother of the baby developed a cough in the fifth month of pregnancy, and the diagnosis of pulmonary tuberculosis was made. The child was born at full term on February 27th, 1921, and was immediately taken away to be looked after by the mother's sister, who lived in a different house; it was taken to the mother nearly every day, but remained in the room with the mother for about ten minutes at each visit. The mother took the baby in her arms, but was careful not to kiss him on the lips. She died from pulmonary tuberculosis on April 19th, 1921.

The baby was at first fed on diluted cow's milk, but as he did not thrive he was given condensed milk diluted to a suitable strength. Wasting became more marked, and signs were detected in the lungs by Dr. Brown, assistant M.O.H. of Barking. The baby was admitted to the East London Hospital for Children, under the care of Dr. Clive Riviere, on May 6th, 1921, when aged 9 weeks.

Condition on Admission.—Wasting was marked; the weight was 6lb. 4oz. The stools were loose and offensive. In the left lung there was a small area of impairment of the percussion note below the inferior angle of the left scapula; the breath sounds were higher pitched over this area, but no added sounds were heard.

Subsequent History.—At the end of a fortnight the weight was 5lb. 14oz. The temperature varied between 97° and 99° F., the pulse rate between 110 and 140, and the respiration rate between 40 and 50. Otherwise its condition was little changed. Diarrhoea and vomiting set in and the child died on May 23rd, 1921. The temperature was above 101° F. on two occasions before death; the pulse gradually became rapid, weak, and imperceptible; the respiration rate remained at 40.

Post-mortem Examination.—The body was very wasted. As regards the brain, there was nothing to note. In the heart a probe passed through a valvular foramen ovale. In the right lung a few areas of partial collapse were present posteriorly. In the left lung there was an area 1 cm. square of tuberculous consolidation, partly caseous at its centre, situated on the exterior and posterior surface of the left lower lobe, near the apex of the lobe. From the consolidated area miliary tubercles extended. By palpation and section the caseous mass could be traced into caseous glands, of a size up to 1 cm. in diameter, in the hilum of the left lung. The right paravertebral glands and angular glands were enlarged up to 3 mm. in diameter. Parenchymatous degeneration was present in the liver. Several doubtful tubercles were found under the capsule of the spleen. In the kidneys parenchymatous degeneration was present. Thin buff-grey contents were found throughout the intestines; a score of shallow erosions 1 mm. in diameter extended along the line of the mesenteric attachment of the lower ileum; the mesenteric glands were 0.5 cm. in diameter.

Family History.—The mother's father died from "pneumonia" of fourteen weeks' duration in 1915. One of her brothers died from tuberculosis in 1908. Her sister and other brother are alive and well. The mother had one miscarriage two years before this baby was born.

I am indebted to Dr. Clive Riviere, under whose care the case was, and to Dr. R. Donald, pathologist to the East London Hospital, for permission to publish these notes.

The source of the infection was undoubtedly the mother, and mere proximity of the baby to the mother every day was sufficient opportunity for infection to occur, although it is to be noted that the child came of a tuberculous family. The tubercle bacilli gained entrance to the respiratory tract, presumably by inhalation, and gave rise to a caseating pulmonary tuberculosis, without general dissemination. Signs in the left lung were detected at the early age of two months, and death occurred from an intercurrent disease at three months.

THE Kenya *Agricultural Census* for the year ending June 30th, 1920, is the first report in respect of the agricultural, dairying, and pastoral industries of that colony and protectorate. Some six million acres have been set aside for the occupation of Europeans, including half a million acres allotted for the settlement of discharged soldiers; about half this was occupied when the census was taken; the area under actual cultivation was over 176,000 acres; much of the remainder was devoted solely to stock raising. The *Census* shows that the colony is progressing favourably in spite of the hard times from which all countries are suffering as a result of the war; with settlement of the local currency question a further improvement in the outlook for Kenya Colony may be expected.

EIGHTY-NINTH ANNUAL MEETING

OF THE

British Medical Association.

Held at Newcastle-on-Tyne, July, 1921.

SECTION OF PATHOLOGY AND BACTERIOLOGY.

Professor MATTHEW J. STEWART, M.B., M.R.C.P., President.

DISCUSSION ON HAEMOCHROMATOSIS.

OPENING PAPERS.

I.—JOHN SHAW DUNN, M.D.Glas.,

Professor of Pathology, University of Birmingham.

THE term haemochromatosis has come to be applied to a peculiar morbid condition, characterized by accumulation of free iron-containing pigment in certain parenchymatous organs and in the skin, associated with interstitial fibrosis of the liver and pancreas; in a certain number of cases glycosuria develops. A discussion of the pathology of the condition may best be introduced by a description of the morbid appearances in a well marked case. The skin, especially of the exposed parts of the body, exhibits a brownish or greyish-brown pigmentation. The liver is more or less cirrhotic, but is usually not much, if at all, diminished in size. Ascites may be present if the cirrhosis is advanced. The liver has a peculiar rusty colour, which may be fairly homogeneous, or may be paler in small rounded nodules which represent hyperplastic liver tissue. When tested for the presence of free iron by immersion in a mixture of potassium ferrocyanide and hydrochloric acid the liver tissue gives an intense Prussian-blue reaction. The pancreas shows a rusty colour similar to that of the liver, though less marked, and also gives an intense reaction for free iron. The retroperitoneal lymphatic glands in the upper part of the abdomen are even more intensely rusty in colour than the liver, and are laden with iron pigment. Most of the other organs, even although they may not be obviously pigmented, give the iron reaction on testing. The spleen reacts intensely; the heart, lungs, stomach, and thyroid may show a fairly deep coloration; the kidneys usually react rather faintly, as do the intestines and the skin. The peripheral lymphatic glands in the neck, axillae, and groins usually show little or no coloration. In cases where the bone marrow is examined it is usually observed that there is no special overgrowth of red marrow, the condition being in marked contrast to that observed in pernicious anaemia and other haemolytic conditions in which free iron is deposited in the viscera.

Histological examination of the organs reveals the presence of brown granular pigment in proportion to the strength of the iron reaction seen on testing macroscopically. In the cirrhotic liver large amounts are seen in the hepatic cells in fine separate granules, and larger masses are present in great abundance in the overgrown fibrous tissue of the portal tracts. If sections are treated with the iron-testing reagents the pigment granules give the iron reaction, but it is observed that if cold hydrochloric acid is employed it is only the granules in the liver cells which give an intense blue colour, the pigment in the fibrous tissue colouring only a greenish-brown. If hot hydrochloric acid is used all the pigment gives an intensely blue colour, showing that all of it is highly ferruginous, but that that in the portal tracts is less accessible to chemical reagents than the rest. In the retroperitoneal glands the pigment, which occurs in great excess in phagocytic cells in the lymph sinuses, reacts feebly with cold acid but intensely with hot acid. It would therefore appear that the iron moiety of the pigment is more free chemically when first deposited in the liver cells, and becomes more firmly combined with protein material when it is taken up by phagocytes and carried to the lymphatic system for disposal. In the pancreas the cells of the glandular acini, and the islets of Langerhans, as well as phagocytic and other cells in the overgrown fibrous tissue, are laden with

iron-containing pigment, that in the parenchymatous cells being chemically more free than the rest. The glandular tissue shows varying degrees of degeneration and atrophy, and the islets of Langerhans have been described in many cases as especially damaged. It would appear, however, on the whole, that the islets are less pigmented than the ordinary gland tissue. In the other organs of the body iron pigment can usually be recognized in granules to a greater or less extent; it is abundant in splenic phagocytes, in cardiac muscular fibres, in thyroid cells, in glandular epithelium, and in submucosa of the stomach, etc. In the skin it occurs in epithelial cells and in phagocytes round about the sweat glands. It would seem that apart from the liver and pancreas the haemosiderin granules are not associated with special degenerative phenomena in the tissues.

The above description would apply to advanced and terminal cases of the disease where death results from the hepatic cirrhosis or from diabetes, though it may be noted that well-marked pigmentary changes may be present in absence of glycosuria. The earlier stages of haemochromatosis, so far as is known, are unassociated with any symptoms, and for any information regarding earlier stages we are dependent on accidental *post-mortem* findings in patients dying of other maladies. A brief reference may be made to three cases, hitherto unpublished, which appear to belong to this category.

The ages of the patients were 57, 57, and 59 years respectively. Death was due in two of them to peritonitis, the origin of which was undiscovered, and in the other there were symptoms of intestinal obstruction for which no certain cause was found *post mortem*. Only one showed pigmentation of the skin due to haemosiderin, and none had glycosuria in the single sample of urine obtained in each case from the bladder *post mortem*. In each the liver showed a very slight degree of cirrhosis, and fairly abundant haemosiderin in hepatic cells and portal tracts. The conditions in the pancreas were of interest:

(*a*) In one there was a comparatively slight interstitial pancreatitis; the glandular tissue was fairly well preserved, but the cells contained abundant haemosiderin. The islets of Langerhans appeared almost normal and their cells showed very little iron.

(*b*) In the second case there was a similarly slight cirrhosis with little damage of glandular acini. Here the islets appeared quite normal and were free from iron pigment, while the only iron pigment visible was present in glandular acini round about the islets.

(*c*) In the third case the cirrhosis of the pancreas was more marked than in the other two and the glandular epithelium showed some lowering of type, but no iron pigment was present either in acini or in islets.

The appearances in these early cases bear to some extent on the question as to whether the pigmentation or the cirrhosis is the primary factor in haemochromatosis. So far as these cases show anything, it is that neither factor is causative of the other, and presumably the two are due to some third unrecognized cause.

Chemical analyses of the organs in haemochromatosis have thrown a certain amount of light on the pathology of the disease. First of all, estimations of amounts of iron in the various organs have elicited important facts regarding the probable duration of the morbid process. In this connexion it is important to recall the normal distribution and metabolism of iron in the body. In the normal body the total amount of iron amounts to about 5 grams, and roughly half of this, 2.5 grams, is in the haemoglobin of the blood. All tissues contain a minute percentage, the liver and spleen carrying more than other tissues. A small amount of iron is constantly taken in with the food, and a corresponding amount is excreted, mainly in the faeces, so that a condition of equilibrium exists. A minute amount is constantly present in the urine in organic combination, showing that a certain amount of iron is constantly being excreted from the tissues. Stockman found that in an ordinary dietary about 10 mg. of iron were taken into the body daily. Sherman, in America, has made this figure rather higher—namely, 12–19 mg.

In advanced cases of haemochromatosis there is no evidence of alteration in the total amount of iron in the blood, while the excess in the organs is very great. It is not exceptional for the iron in the liver to amount to 7 per cent. of the dried substance of the organ, that is about 100 times the normal percentage, and for the total amount of iron in the liver to exceed 30 grams. Considering the large size of this organ, it no doubt contains a large proportion of the total iron in the body, but the amount present in others is not negligible. If, however, we consider the liver alone, and estimate the iron in the diet as 30 mg. per day—a figure well in excess of the known analyses—then it would take 1,000 days for the accumulation of the 30 grams in the liver, assuming that all the iron in the food was absorbed and none excreted. No very prolonged observation appears to have been carried out on the iron metabolism in haemochromatosis. Garrod and his co-workers found no iron in the urine or bile, nor in 5 c.cm. of faeces in their case. More recently Howard and Stevens, investigating a case, found no iron in the urine over a period of five days; during the same period the iron excreted in the faeces—26.8 mg.—was less by 2.5 mg. than that taken in by the mouth, the patient being on a special fixed diet with a known content of iron. This margin is probably too small to be outside the limit of experimental error, and observations over a longer period would be desirable. The observation is, however, of great importance, as it shows that the retention of iron in a well marked case is not absolute, and therefore the period during which we must assume that a part of the alimentary iron undergoes retention must be greatly lengthened to explain an advanced condition of haemochromatosis.

As regards the immediate source of the iron in the viscera in haemochromatosis, it was at first assumed to be derived from an excessive breakdown of haemoglobin in the blood, on the analogy of pernicious anaemia and other haemolytic conditions where free iron is deposited in the organs. It must, however, be noted that in the majority of cases of haemochromatosis which have been described there has been no important alteration in the blood, and where the bone marrow has been examined it has shown no compensatory hyperplasia such as accompanies severe anaemias. Roque, Chalier, and, Nové Josserand in France, and Howard and Stevens in America, have noted excessive fragility of the red corpuscles in their cases, but this cannot be taken as proof that *in vivo* the red corpuscles were being destroyed more rapidly than normal. Even in pernicious anaemia, though the iron in the liver and other viscera may be much in excess of the normal, it is far short of what occurs in haemochromatosis, and, indeed, may often be accounted for by the amount of iron lost from the depleted blood, so that the total iron in the body is not appreciably increased. The condition in haemochromatosis is very different, for here we have no certain evidence of abnormal haemolysis, and even if the iron which accumulates in the viscera has first passed through the form of haemoglobin we have still to recognize some factor which causes it to be retained in the system. Of the nature of this factor we have at present no certain knowledge, and we can only refer to it in very general terms as an increased avidity of the tissues for iron.

II.—W. H. Maxwell Telling, M.D., F.R.C.P.Lond.,

Physician, Leeds General Infirmary.

Under the names haemochromatosis and bronzed diabetes attention has been drawn during the last forty years to an interesting morbid condition. It is still an unsettled question as to whether it is a separate disease or just a stage or development of certain forms of cirrhosis of the liver. But the main clinical and pathological features are so sharp and distinctive as to lead most observers to regard it as a distinct disease. It occurs between 30 and 60 and is almost exclusively confined to males. Its essential features are: (1) A massive deposit of iron-containing pigment in the viscera, (2) a peculiar pigmentation of the skin, (3) hypertrophic cirrhosis of the liver, (4) fibrosis of the pancreas, and (5) glycosuria.

By the earlier observers, Hanot and Chauffard, the glycosuria was regarded as the essential phenomenon, and the condition was then called *diabète bronzé*, the pigmentation being regarded as secondary. It is now known, however, that though glycosuria occurs in the majority of recorded cases it is not a constant feature. It is not usually of severe type, but varies in degree, is late and almost terminal in its onset (though sugar may disappear from the urine in the final stage of cachexia), and is now generally regarded as secondary to the fibrotic changes in the pancreas.

There are, then, two conditions which are essential: (1) A very considerable deposit of pigment in the body, and (2) a hypertrophic cirrhosis of the liver and fibrosis of

the pancreas. The disease is mostly in elderly men, and lasts about two to three years as a rule. There is not infrequently an alcoholic history, though a number of perfectly typical cases have been recorded in which alcohol did not enter into the etiology. The diabetic phenomena are slight or moderate, and occur, if at all, late in the disease. The liver is considerably enlarged, and the enlargement may be mainly in one lobe, the right or the left; it is a little tender, firm, smooth, and the seat of a fairly uniform cirrhosis. Abdominal distension, with attacks of diarrhoea alternating with constipation, are common. The spleen may be palpable, and usually shows some fibrotic change.

The pigmentation of the skin is characteristic, and is the clinical feature which has generally led to the recognition of the disease during life. The tint varies from a leaden colour to a more definite bronzy appearance; but, whatever the tint it tends to be "metallic." Exposed surfaces are more deeply pigmented. The pigment deposit is massive in the liver, pancreas and, especially, the lymph glands: the heart and muscles also show it; the spleen and kidneys may be pigmented or normal. The viscera implicated tend to have a dark reddish-brown tint, quite characteristic in a well-marked case. There is sometimes slight jaundice.

The patients are curiously listless and apathetic, in a way that is often seen in Addison's disease, to which the pigmentation adds another resemblance. The disease is uninfluenced by any treatment, and there is a progressive cachexia till death ensues.

In 1899 von Recklinghausen described a group of cases to which he gave the name haemochromatosis. Under this term he included not only the previously recognized cases of bronzed diabetes, but certain cases of cirrhosis of the liver with general pigmentation and certain cases of purely local deposit of pigment. These last do not for the moment detain us, but the cases of cirrhosis with general pigmentation constituted a well marked clinical group, apparently distinct from all other diseases, and of which the original bronzed diabetic cases were only an advanced stage. The term haemochromatosis, therefore, has come to be the name in general use.

Theories as to the exact pathology are numerous and conflicting. Broadly they are three: (1) that the deposit of pigment is the essential process, with the visceral fibrosis as secondary; (2) that the cirrhosis is primary and leads to the increased pigment deposit; and (3) that both processes are the result of a primary and as yet unknown cause.

At first it was assumed that the pigment deposit was due to an excessive blood destruction, but no evidence of such excessive blood destruction has ever been found; there is only occasionally a slight and purely cachectic anaemia. Many subjects were shown to be alcoholic, and this was thought to be the underlying cause of a cirrhosis in the first place. But many cases are certainly innocent of alcohol, and this goes far to weaken the case for cirrhosis as the primary factor.

It was noted by Opie (1899) that the deposit of pigment was greatest where pigment tended normally to be present, and this led to the view that it might be regarded as a morbid exaggeration of a normal process of pigment deposit. Parker, in 1903, made a further suggestion that the condition is not so much an excess formation of pigment as a defective iron elimination; for such defective elimination there is some pathological evidence (Garrod and Gaskell, 1914). Von Recklinghausen, in 1889, had shown that there were two pigments: (*a*) an iron-containing haemosiderin and (*b*) an iron-free haemofuscin. The unduly rigid insistence on these facts, perhaps, hampered progress a little, for it has been shown that haemofuscin, if specially treated, reveals the presence of iron.

It was tempting to regard the cirrhotic process as secondary to the irritation of the massive pigment-deposit, but it is very doubtful if the pigment does irritate in this way. Potter and Milne (1913) noted that where the pigment was most massed there was least evidence of parenchymatous degeneration. The parenchymatous degeneration observed was thought to be the real cause of the fibrous tissue overgrowth, and to be itself the result of a general metabolic disturbance. These observers incline to the view that cirrhosis, however caused, is the primary gross pathological change and that pigmentation, which occurs in a greater or less degree in many cases of cirrhosis of the liver, is in haemochromatosis merely carried to an extreme stage. To-day, and despite recent observations, we are inclined to regard haemochromatosis as a separate morbid entity. There is an interesting series of cases of haemochromatosis in which the liver has undergone cancerous degeneration, primary in its tissue, and it must be admitted that here is another possible link with "ordinary" cirrhosis, in which cancerous degeneration has long been a well recognized event. But such malignant process may be regarded as being entirely sequent to the fibrosis only, and therefore just as much a secondary happening in this disease as in the glycosuria.

A further general point may be made. There is very little indeed in the English medical literature about this disease, and in the past it cannot be doubted that many cases have escaped recognition owing to the disease being relatively unknown as well as rare. In early cases, though by strict comparison with the normal a certain degree of skin pigmentation might be detected, it may not be of a degree sufficient to lead to a diagnosis during life. Yet I have seen two cases which had already developed—and died from—primary malignant disease of the liver without definite skin pigmentation. The recorded cases are almost all of the advanced type, with characteristic pigmentation and frequent glycosuria; by placing early cases on record, particularly with the striking eventuation in malignant disease, more general attention will be directed to the disease, which will then probably be found to be less rare. It would seem that every case of cirrhosis of the liver, and most certainly every case leading to primary carcinoma, should be carefully investigated from the haemochromatosis point of view. By this means much light will undoubtedly be thrown on pigment metabolism and will enable a final decision to be arrived at as to whether haemochromatosis is a separate morbid entity.

DISCUSSION.

Dr. J. F. GASKELL (Cambridge) said that his remarks were all founded on a single case investigated under Sir Archibald Garrod and published in the *Quarterly Journal of Medicine*. This case was fully in accord with all that Professor Shaw Dunn had advanced, and the conclusion arrived at was that the tissues had an abnormal avidity for iron. The condition of the normal paths of excretion of iron was interesting. In the kidney the iron was in glomeruli and tubules of the second order only, thus differing entirely from the arrangement in a condition of blood destruction such as pernicious anaemia where the iron was all in the first convoluted tubules. In the liver the iron was accumulated round bile canaliculi and also in the walls of the bile ducts. These appearances suggested an attempted excretion by normal channels associated with rapid reabsorption. It was possible that the condition was an essential error of iron metabolism with the presentation of the iron to the tissues in an abnormal form; it was excreted abnormally and reabsorbed. The body then made attempts by lymphatic channels to remove the excess of pigment, and from these channels the progressive accumulation of iron in the surrounding connective tissues took place.

Dr. R. L. MACKENZIE WALLIS (London) defined haemochromatosis as a condition where iron-containing pigments were deposited in certain tissues in abnormal amounts. Since in his experience the pigments could all be shown by appropriate methods to contain iron, it did not appear advisable to retain the names haemosiderin and haemofuscin. By hydrolysis with strong acids with the application of heat it was possible to show that both pigments contained iron, though in different amounts. The terms were further unsatisfactory in that they implied an origin from haemoglobin, and up to the present time all the evidence was against such a supposition. Investigation of a case of bronzed diabetes with Sir Archibald Garrod and others (*Quarterly Journal of Medicine*, 1914, vol. vii, No. 26, p. 129) revealed the following facts: (1) There was generalized haemochromatosis with deposition of iron-containing pigments in certain cells; (2) there was degeneration and death of such cells with marked interstitial inflammation of certain organs, especially the liver and pancreas; (3) there was chronic interstitial pancreatitis, with diabetes and death. There was no evidence of any abnormal

haemolysis, and the large quantity of iron in the liver—namely, 32.8 grams—could hardly be explained on the supposition that the iron could be derived from the normal daily haemolysis, which is known to take place. The view that haemochromatosis was a late event in the condition would thus appear to be substantiated.

In a search of the literature great stress was laid upon the fact that many cases gave a history of alcoholism, but this was founded on somewhat indefinite grounds. The one striking point which his investigations of bronzed diabetes showed was that the tissues had an abnormal avidity for iron, so that no trace could be found in the urine, bile, and faeces, and there was no abnormal amount of non-haemoglobin iron in the blood. The explanation of this extraordinary avidity for iron was not yet forthcoming. He thought that all cases showing abnormal pigmentation of the skin, particularly those with diabetes mellitus, should be investigated on these lines. Reference was made to a case of xanthoma diabeticorum, which was at present under investigation.

The question had been raised, Which part of the syndrome in haemochromatosis was primary? Was it the iron-containing pigment which produced the cirrhosis? If one disregarded the terms haemosiderin and haemofuscin, and substituted a name for the iron-containing pigment, an explanation might be forthcoming. In his opinion the free iron pigment caused the cirrhosis whilst the masked iron pigment represented an attempt on the part of the body to get rid of this pigment by means of the lymphatic system. The liver, pancreas, and kidneys contain most of this free-iron pigment, whereas the other pigment (symhaemofuscin) is deposited chiefly in the muscles, blood vessels, and lymphatic glands. It is worthy of note that large amounts of iron were found by Muir and Dunn in the retroperitoneal glands.

Dr. JOHN CRUICKSHANK (Aberdeen) described a recent case of haemochromatosis which had not yet been fully worked out. The patient, a man aged 37, was a native of Aberdeen. He complained of a tight feeling around the abdomen. There was no anaemia or glycosuria. The haemochromatosis was not discovered during life, and no obvious relation could be made out between the clinical symptoms and *post-mortem* appearances. Iron-containing pigment was present in abundance in the liver and in the abdominal glands, but no excess of iron was discovered in the circulation. Besides the typical iron granules, a golden-brown pigment was present in the organs, particularly in the walls of arteries, which did not react to chemical tests for iron. He thought that it was useful to make a distinction between the forms of iron found in the tissues. The terms haemofuscin and haemosiderin were of some value. Iron was not present in the same form in every situation. He asked whether it was possible to ascertain the exact chemical composition of the pigment in each case.

Professor J. M. BEATTIE (Liverpool) said that there were two points which specially interested him in this discussion. Most speakers had stated that the diabetes was a late manifestation. In the case published by him in 1904—the first case, he thought, with *post-mortem* records published in this country—the glycosuria was, as far as he could determine, present for about three years before the bronzing of the skin was noted. At the *post-mortem* examination the cirrhosis and pigmentation of both liver and pancreas was very advanced, and he thought it very likely that these conditions had existed for a very long time. It also seemed almost certain that the pancreatic condition and the destruction of the islets of Langerhans were responsible for the glycosuria, and must have been in existence for at least three years.

In relation to the pigment, he agreed with former speakers that the names haemosiderin and haemofuscin should be dropped, but at the same time it must still be recognized that two types of pigment were usually present. It was true, as he pointed out in 1904, that with the aid of heat much of the pigment which did not give an iron reaction in the cold could be made to do so. But there was still a considerable amount of pigment left which would not give the free iron reaction. This might correspond with the pigment seen in the liver in chronic venous congestion, and in his opinion a great deal of the pigment of the liver and of the spleen—that in which the iron was in firm and that in which it was in loose combination—might be derived from the blood in the liver and spleen respectively; for in both of these organs, on account of the marked degree of cirrhosis, there was a necessary venous congestion, and, even in the smaller vessels, a thrombosis. Thus, without marked changes in the peripheral blood or in the bone marrow, there must be a good deal of local blood destruction in the various cirrhotic organs.

Professor J. SHAW DUNN, in concluding the discussion, said that the pigments described by von Recklinghausen probably comprised two quite distinct varieties—namely, haemosiderin, which occurred in parenchymatous cells and fibrous tissue, and a non-ferruginous pigment, which was confined to non-striated muscular fibres, in arterial walls, and in the intestines. The latter probably corresponded to the pigment of brown atrophy of heart, liver, etc., and was not characteristic of haemochromatosis. As regards the iron-containing pigments, it was difficult, if not impossible, to obtain them in a pure condition, and therefore to analyse them. On the whole the appearances suggested that in haemochromatosis the iron was first deposited in hepatic cells on normal physiological lines, but in exaggerated form. In haemolysis iron settled out mainly in the liver cells. For the recognition of early cases it would appear that pigmentation of the skin was the likeliest feature to rely on. If glycosuria was present the condition would be advanced. Possibly the pigmented skin would give the iron reaction *in vivo*.

Professor MATTHEW J. STEWART (President) said that he had seen six cases of haemochromatosis, *post mortem*, in the past seven years, and agreed with speakers who expressed the view that the disease was probably more common than was generally supposed. In two of the four cases shown primary carcinoma of the liver coexisted. Bronzing and glycosuria, being late manifestations, were of little use in the early diagnosis of cases, and the presence of haemosiderin granules in the urine, noted by American observers, would probably be found liable to the same defect, since renal siderosis also occurs late in the disease. Inasmuch as the lymph glands in relation to the liver and pancreas were among the chief and earliest seats of pigmentary deposition, surgeons might be invited to examine these glands in cases where, for any reason, the upper abdomen was explored. In the event of brown glands being discovered, one of them might possibly be excised for histological investigation.

DISCUSSION ON THE STREPTOCOCCI.

I.—J. MARTIN BEATTIE, M.A., M.D.,

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THE HAEMOLYTIC STREPTOCOCCI.

THE high frequency of haemolytic streptococci in the human throat may explain the important rôle these organisms play as secondary invaders in a multitude of diseases. At the same time it must be recognized that, like the pneumococcus or *B. diphtheriae*, they may be present in normal throats, and, under certain conditions which we do not clearly understand, may become the actual causal agent of the disease.

Very many observers have noted the presence of streptococci in the throat in from 14 to 90 per cent. of cases, the larger percentages being in camps where men were collected in large numbers, and often in a limited space. Thus, Levy and Alexander[1] found haemolytic streptococci in swabs of the pharynx in 14.8 per cent. of 489 new recruits, while in a company of healthy men at camp for six months they found 83 per cent. Fox and Hamburger[2] give figures almost identical with these—15 per cent. in a group of normal men early in a measles epidemic, and six months later in 83 per cent. of a similar company. Other workers report 40 to 50 per cent.

The difference in percentages is, no doubt, due to the thoroughness with which the swab has been taken; thus, Pilot and Davis[3] show that there is a considerable difference in percentages if the swabs are taken from the surface or the crypts of the tonsil. Thus, swabs taken from the pharynx in 100 cases with enlarged tonsils gave 43 per cent. of haemolytic streptococci, from the left

tonsillar surface 49 per cent., and from the right tonsillar surface 59 per cent. Cultures from the crypts of the same tonsils after excision gave 92 per cent. of streptococcal infections. In another series of cases swab cultures were made from the pharynx, the surface of each tonsil, from the gum margin, and the nose of twenty-four healthy persons who gave no history of recent sore throat, and whose tonsils showed no gross evidence of inflammation. In cultures of the pharynx haemolytic streptococci were found in 25 per cent., and in cultures of the surface of the tonsil 58 per cent. In no instance were they found on the gum margin, or in the nose. Non-haemolytic streptococci were noted in all cases from all the situations. My own observations fully bear out these results. During the time I was examining contact cases of cerebro-spinal meningitis and influenza the striking feature was the almost universal presence of streptococci in the naso-pharyngeal swabs, and my experience in the routine swabbing of diphtheria and suspected diphtheria cases is similar.

It is significant that in the various acute infections a common starting-point is the throat. One of the earliest symptoms is "sore throat," and in such cases the haemolytic streptococci can generally be demonstrated in large numbers, and this same organism is found later in the complicating lesions. Taking an average of several observers in four common diseases, the prevalence of these haemolytic streptococci is striking:

Scarlet fever ...	...	131 cases ...	91 per cent.
Measles ...	...	538 ,, ...	72 ,,
Influenza ...	...	340 ,, ...	70 ,,
Lobar pneumonia ...	...	151 ,, ...	50 ,,

Pearce[4] regarded streptococci as the most common cause of bronchopneumonia, otitis media, and other general infections secondary to infectious diseases. Perkins and Pay[5] found the streptococcus in 95 per cent. of the total cases of variola, and recovered the same organisms from the blood before death in eight of thirteen cases. Dick and Henry[6] isolated haemolytic streptococci from the blood, lymphatic glands, and spleen and urine in cases of scarlet fever. It may be said that scarlet fever, in which disease the streptococcus is practically always found, is caused by this organism, and the recent paper by Gordon[7] gives a good deal of support to this view. By the absorption of agglutinin test he differentiated the haemolytic streptococci into three distinct groups or types, and he showed that Type III was the organism chiefly found in the secretions on the tonsil and fauces in scarlet fever, and, I think very justly, says that "the possibility must be realized that the streptococcus in question may ultimately be established as the essential cause of scarlet fever."

My own observations in this field are somewhat limited, but in one case of suspected meningococcal meningitis a pure growth of a streptococcus was isolated from the cerebro-spinal fluid. There was, however, no evidence of meningococcal meningitis, and the man developed scarlet fever. Unfortunately at the time it was not possible to make a careful study of the organism, and the culture died before any work of value could be completed.

Councilman, Mallory, and Pearce,[8] in a very extensive study of diphtheria, found the *Streptococcus pyogenes* to be the most frequent organism associated with diphtheria in the various complications of this disease. In measles the swabs from the throat show streptococci in from 55 to 100 per cent. of cases according to different observers, and it is recognized by all workers that the complications of empyema and bronchopneumonia are due to this organism. A great amount of work has recently been published by various American bacteriologists on the acute respiratory affections associated with influenza, measles, etc., in various large camps. There is practically a unanimity that in the throats of such patients haemolytic streptococci are constantly found and that these are apparently identical with those found in the pulmonary lesions.

Pilot[18] and others in 1918, during the pandemic of influenza, isolated haemolytic streptococci from the lungs in 43 per cent. of the cases. Cole and MacCallum[9] state that the *S. haemolyticus* is the chief, if not the only, cause of bronchopneumonia following measles, and they give the following interesting statistics: Of 69 patients in a measles ward 39, or 56.5 per cent., had haemolytic streptococci in their throats, whereas, of 28 patients suspected of tuberculosis, only 6, or 21.4 per cent., showed streptococci; further, patients on admission to the measles ward gave a percentage of 11.4, in three to five days afterwards 38.6 per cent., and in eight to sixteen days 56.8 per cent.

From all the evidence we have, there seems little doubt that the streptococci present in the healthy throat are the important causal agent in the complications following infectious diseases, and it may be that in the respiratory complications the actual cause of the disease may so act on the respiratory mucous membrane as to render it susceptible to attack by these streptococci. There is a good deal of evidence, especially in the careful studies of MacCallum,[10] in support of this view, and further, the experiments of Blake and Cecil[11] show that a preliminary injury to the respiratory tract by gassing with chlorine greatly facilitates the invasion of the lung by *S. haemolyticus*.

Acute primary streptococcal infections are familiar to us all. A recent case which came under my attention is of some interest:

> The patient, a boy of 10 years, was at school apparently well on a Tuesday; the following day he complained of headache and sore throat. On the Thursday he was unconscious and the doctor was sent for. When he arrived he found the limbs rigid, the jaw firmly contracted, so that the mouth could not be opened, and the patient quite unconscious; the boy died that evening. At the *post-mortem* examination a mass of enlarged, acutely inflamed lymphatic glands was found on each side of the neck at the angle of the jaw; these were haemorrhagic in parts. The various organs showed the results of septic absorption, but there was no gross pathological lesion. In the spinal cord, in the dorsal region there was an area of acute softening, about one inch in length. From these glands and from the softened area in the cord a pure growth of a haemolytic streptococcus was obtained. A suggestion was made that the case might have been an early one of scarlet fever, with no special development of the rash, but, so far, no definite evidence has been obtained in support of this view.

Cases such as this, and the facts I have brought forward of the prevalence of streptococci, naturally suggest a more exhaustive study of these organisms, and the means of destroying them, or, at any rate, of antagonizing their pathogenic effects. It is clear that the streptococci, as we meet them, differ considerably in their morphological characters, their manner of growth, their biologic activities, and especially their pathogenicity, and it is therefore important that we should, if possible, know what special type of organism we are dealing with in each case.

These facts being established, the natural question arises: Can we by any means destroy these organisms in the normal individuals, or can we render the individual immune to their action? In answer to the first portion of the question I say very little. My own experience leads me to the view that a considerable amount of the spread of infective diseases can be prevented by a systematic and regular disinfection of the mouth and nasopharynx with effective and non-irritant antiseptics. With regard to the second portion of the question, this is a scientific problem, and the evidence at present, though very incomplete, suggests a more careful investigation of the streptococci, particularly from the classification side.

The systematic classification of bacteria is a problem of very great importance in the proper understanding and the control of infectious diseases. To the surgeon, the presence of streptococci in a wound is generally regarded as more serious than the presence of staphylococci, and yet we know that the streptococcus may be almost innocuous and the staphylococci most virulent. Streptococci, indistinguishable by all ordinary tests from those responsible for the pathological processes in serious diseases, have been found to be present, and to live, apparently without harm to the host, on the mucous membranes of a large proportion of normal individuals. Is this difference in reaction to be accounted for by difference in susceptibility of different individuals or to differences in the organisms themselves? Are we to regard the streptococci as grouped into several distinct species or as variants of one species? Numerous tests have been devised to determine this latter point, but at present there seems to be no general agreement as to their value.

I. The morphological characters were used, and the long-chained (*S. longus*) and the short-chained (*S. brevis*)

were differentiated; the former were regarded as the more virulent, but every bacteriologist, even of moderate experience, must have realized that the long-chained organisms are frequently found on the mucous membranes of healthy individuals, and the short-chained often the cause of intense septicaemia and death.

II. Again, the carbohydrate splitting powers were used, and the work of Gordon,[12] Andrewes, and Horder[13] stands out as a very distinct advance in classification. Their work, however, was repeated by various observers, and the classification has been attacked on several grounds: (1) Walker,[14] and Yates and Beattie[15] showed that the fermentation reactions were not constant in any strain, but varied from time to time, and, further, that they had no relation to pathogenicity. (2) Winslow[16] and others in America maintained that the mere fermentation in itself was unsatisfactory as a test, but that, in addition, it was essential to determine the quantity of acid produced. (3) Hopkins and Lang,[17] on the other hand, maintain that the streptococci concerned in the severe infections in man may be differentiated from the common saprophytic types by fermentation tests, and they recommend a special media (infusion broth, coloured with litmus, and containing 2 per cent. or more of peptone and 1 per cent. of fermentable sugar, and having an initial reaction between 0.0 and 0.5 per cent. normal acidity—phenolphthalein). They further state that the titrations of the amount of acid formed is of no value; that the highly pathogenic strains are usually strongly haemolytic. They, however, agree that the validity of the fermentation tests depends chiefly on whether or not they remain constant in a given race, and this, they admit, they have not tested sufficiently. The general conclusion seems to be that the tests of Gordon are valuable for organisms recently isolated, and give us some indications as to the source from which these organisms come.

III. More recently classifications have been based on haemolytic and immunological reactions, and it is to this aspect of the question that I wish specially to refer. A great deal of work has been done, especially in America, on the streptococci found in bronchopneumonia and in influenza, and it may be taken as generally agreed that the organisms of this type, which are specially pathogenetic, are haemolytic in their reactions. Thus, Rosenow says, there is a direct relationship between haemolytic streptococci and acute streptococcal infections, while chronic streptococcal infections are more closely associated with the *viridans* type (non-haemolytic). Holman[19] states that the majority of streptococci producing pyogenic infections are haemolytic.

Agglutination.—This reaction has not been largely employed; the main reason for this is that most strains of streptococci undergo spontaneous granulation when employed for agglutination tests, and only by repeated experimentation have means been devised to overcome this difficulty. Dochez, Avery and Lancefield,[20] claim to have succeeded in preparing antigens which remain homogeneous. I do not propose to detail their methods, but one essential seems to have been a very accurate adjustment of the hydrogen ion concentration. Experiments in my own laboratory have emphasized the great importance of the reaction of the media, even in the actual growth of these organisms. By their methods these observers have determined four distinct biological types out of 125 strains of *S. haemolyticus*. Havens[21] found that three principal groups constituted 93 per cent. of his series of 292 strains.

Precipitation Tests.—Barnes,[22] using the undiluted supernatant broth from a centrifugalized culture and adding equal quantities of this to diluted rabbit anti-streptococcic serum (dilutions 1 in 50, 1 in 100, 1 in 200, 1 in 400, 1 in 800, 1 in 1,600, and 1 in 3,200), found, after incubation, that there were flocculent precipitates in the homologous combinations of the highest dilutions. After careful control of his experiments he concluded that specific precipitins were formed, also group precipitins. He compared these precipitin reactions with the haemolytic and fermentation reactions—the latter carried out according to Holman's method, using, however, a carbohydrate-free broth instead of Hiss serum water—and with few exceptions the reactions agreed. He concludes thus: "One thing quite definitely indicated is that streptococci may ultimately be divided into a number of groups with specific metabolic functions, and having specific immunizing properties as shown by the results of the haemolytic, fermentative, and precipitin tests."

I have given you a very brief outline of these biologic reactions, and it remains for me to indicate their important bearing on the problems of disease. Not many years ago it would have been difficult to find much enthusiasm for the use of antimeningococci serum in the treatment of cerebro-spinal meningitis. I well remember a slight epidemic with which I was associated in which Flexner's serum, which had been proved very efficacious in New York, was tried and pronounced a failure. Since Gordon's work in the differentiation of types, the explanation of the failure is evident. The serum was not homologous, or it did not contain sufficient of the homologous element to be of any value. Those, like myself, who have had to deal with cerebro-spinal meningitis during the recent war know that it is not now a formidable disease, because we can obtain either a polyvalent serum, which contains a considerable amount of the homologous element, or even a homologous serum itself.

We are to-day only at the beginning of the treatment of pneumonia with homologous serum, and though the results so far obtained are not brilliant, still the outlook is far from being a dark one. Can we hope for similar results in streptococcal infections? Records of the therapeutic effects of antistreptococci serum are contradictory. There seems little doubt that success has been obtained in some instances, but in the great majority of cases the result has been negative or possibly harmful. It seems quite clear that the failure is due in large part to a want of appreciation of the diversity of the numerous types of organisms involved. Therefore, any progress is obviously dependent on the recognition of the varieties of the streptococci in any given case.

The next question which naturally arises is, Is there any evidence that this classification into antigenic group varieties is of importance? Gay and Stone, working on experimental streptococcal empyema, used injections of immune serums containing strong antibodies, which had been produced by their *Streptococcus "H"* obtained from a case of bronchopneumonia with empyema. They gave the injections of the serum before the intrapleural infecting dose, simultaneously with the dose, and at periods subsequent to it. In each separate experiment results obtained by immune serum were controlled by rabbits infected at the same time, but treated with normal rabbit serum. They claim that experimental empyema may, in a definite though small proportion of cases, be prevented or even cured by the use of immune serum. Their results were, as I have indicated, obtained by using a definitely homologous immune serum. One can only say, from their results, that a cure may be produced by the use of immune serum, but that the evidence in favour of it being a specific remedy is far from complete. In passing, may I also add that their experiments with vaccines were very unsatisfactory: "The vaccinated infected animals died, not only as rapidly, but even more rapidly than the unvaccinated controls."

Dochez[20] and others have shown that serum can be prepared which is highly protective to white mice against infection with organisms of the homologous type, and that little or no protection results when serum of one type is employed against organisms of the heterologous type. There are undoubted exceptions to this general rule. Occasionally strains of *S. haemolyticus* are found against which all type serums afford a varying degree of protection, and sometimes a serum is obtained from one strain which will protect against an organism of another type. Again, in a series of experiments in mice Havens[21] used three groups of haemolytic streptococci. Mice were inoculated intraperitoneally with two lethal doses of each strain, together with 0.5 c.cm. of each group serum. It was clearly shown that only the homologous serum protected against infection. In every case the mouse, injected with the serum corresponding to the group to which the strain inoculated belongs, lived; all the other mice died.

From the experimental side it seems perfectly clear that the streptococci of human origin are not a unit, but that several types exist, that these types can be differentiated by immunological and other reactions, and that homologous serum can protect against infection. It is true that

at the present there is no real evidence of value that these homologous serums are of practical value in human disease, but I think it can be claimed that a very definite advance in this direction has been made. To the laboratory worker the field opened up is of very great importance. So far, most of the work has been done with haemolytic streptococci isolated from cases of bronchopneumonia, but, when one considers the wide distribution and the important diseases which owe, or possibly owe, their pathological effects to the streptococci the field is almost boundless. My object to-day has been, in opening this discussion, to give, in the short time at my disposal, an outline of the problem before us, a glimpse of the hopeful work that is being done to solve that problem. I hope I may have stimulated some interest and encouraged other workers to join in this often tedious, but, I venture to think, very fruitful line of work.

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STREPTOCOCCUS CLASSIFICATION.

THE problems which confront us in connexion with the streptococci are manifold, and in approaching any of them we sooner or later become confronted by the vexed question of classification. In other groups of organisms the question is less difficult, but in this group classification is involved in a maze, due partly to the manifold schemes which have from time to time been proposed, used for a period, and then found wanting, and have been discarded, whilst the nomenclature and specific names to which they gave rise have been retained to encumber the subject. Partly is the confusion also due to the unsettled position of the question of mutation; whether or not the properties which may serve for a basis change so rapidly and in so haphazard a fashion as to be useless as criteria for differentiation.

Classification thus becomes the alpha and omega of the subject, and a satisfactory system must be necessary if work is to advance at all: and in the few words which I have to contribute to this discussion I wish to limit myself, in the main, to this aspect of it. The necessary essentials for any useful classification in human bacteriology appear to be: (1) simplicity; (2) sharpness of division, and (3) a real meaning of any subdivisions so arrived at, relative to the significance of the organisms as disease-producing agents. It is essential for simplicity that we should find critical qualities which are as few in number as possible. To give an example of one of the most valuable of these that we possess I would instance the use of the fermentation of lactose in the classification of the typhoid-colon group. Here we have a simple test, which by some almost providential foresight has been assigned to us to serve to sharply demarcate the organisms of this class into two great groups, in one of which is found the important disease-producing members, whilst their closely allied saprophytic brethren are found in the other.

Classifications in bacteriology are often arbitrary divisions having as their aim the separation of organisms into groups convenient for practical purposes, but we must know where to stop. The more we refine our tests and multiply our criteria the more numerous our subclasses become, until we ultimately reach a limit at which classification becomes individual, each organism occupying a class by itself. Streptococcus classification has suffered not a little from this ultra-refinement. As an example I would cite Gordon's initial classification of the salivary organisms;[1] out of 300 strains examined he constituted forty-eight types, the great majority of which can be resumed under one or two headings, and whose recognition as individuals serves no useful purpose. I am not for a moment attempting to minimize the value of Gordon's work. It was a pioneer attempt from which, it may be said, all subsequent efforts have sprung, but, like most pioneers in an unknown land, his successors can profit by his errors as well as by his discoveries.

Let us now turn to Holman's classification,[2] which is a relatively simple one, and examine its good and bad points. Holman divides the organisms into the haemolytic and non-haemolytic groups, and thereafter forms further subgroups within these classes upon the basis of sugar reactions. It may be taken as a fair example of the sort of classification most in vogue at the present time.

TABLE I.—*Holman's Classification (1916).*

GENUS STREPTOCOCCUS.

	A. Haemolytic.			B. Non-haemolytic.			
	Lactose.	Salicin.	Mannite.		Lactose.	Salicin.	Mannite.
S. infrequens...	+	+	+	S. faecalis ...	+	+	+
S. pyogenes ...	+	+	−	S. mitis ...	+	+	−
S. subacidus ...	−	−	−	S. ignavus ...	−	−	−

In the accompanying table (Table I) I have only shown his main classes, omitting some four or five small groups which most people will agree contain too few organisms to deserve serious consideration. Now what is the value of these subgroups? Let us take first the haemolytic series. I have been through Holman's tables and worked out the distribution of these subgroups relative to some of the chief processes from which they have been isolated. The next table (Table II) shows the distribution of 100 of each of these subtypes of the haemolytic series relative to the condition in which they may be found.

TABLE II.—*Haemolytic Streptococci.* (Holman and others.)

Distribution per cent. of each subvariety.

	S. infrequens.	S. pyogenes.	S. anginosus.	S. subacidus.
Faeces	7.5	0.5	—	—
Throat (all conditions) ...	43	26	31	19
Blood	13	11	11	19
Erysipelas and cellulitis ...	5	4	3	4
Abscesses, septic joints, osteomyelitis, etc.	6.5	20.5	5.5	12
Middle ear, mastoid and cranial sinuses	7.5	14	8	7
Other conditions	17.5	24	41.5	39

It will be seen from this table that these different subtypes are distributed very similarly over the various conditions in which haemolytic streptococci are found. It is of special significance that in such conditions as erysipelas and cellulitis (in which the circumstances are most favourable for the isolation of pure growths of the causal organisms, without the risk of isolating at the same time contaminating saprophytes) the figures are so closely similar. In other cases—for instance, in the throat—many of the organisms recorded must belong to the normal saprophytic group. In one case (*S. infrequens*) the incidence of a particular organism is high. It is very possible that this figure may give a mistaken idea of the frequence of this type, since these particular organisms were largely found by one worker (Ruediger), who includes a very high proportion of throat strains in his results. It cannot, therefore, be said, taking the distribution of these types over the different diseases, that they show any such association with disease, or with particular conditions, as would justify us, from a practical point of view, in making a subdivision on these lines. That is, they all show a roughly similar capacity for producing similar diseases, and I therefore think that there is no practical gain in retaining such a subdivision and would prefer to slump all the haemolytic streptococci together in one large and undivided class.

Now let us similarly treat the non-haemolytic strepto-

cocci found in the human body. These are examined in Table III, which is drawn up from the same source.

TABLE III.—*Non-haemolytic Streptoccci.* (Holman and others.)
Distribution per cent. of each subvariety.

	S. faecalis.	S. mitis.	S. salivarius.	S. ignavus.
Faeces	20	3	0.3	1.5
Throat	5	42	47	41
Blood	11.5	8	9	11
Erysipelas and cellulitis ...	0.8	0.4	1	1.5
Abscesses, septic joints, osteomyelitis, etc.	6	6	7	7.5
Middle ear, mastoid and cranial sinuses	1.5	4	2	4.5
Other conditions	55.2	36.6	35.7	33.5

Here again we see little differences in the distribution of the various subgroups amongst themselves in disease processes; although they are much less frequently encountered as agents of suppuration than are those of haemolytic series, a point which justifies the division into haemolytic and non-haemolytic groups. There is, however, one great difference, and that is in their site of distribution in the saprophytic state, it being seen that the *faecalis* form is essentially an inhabitant of the faeces whilst all the others occur relatively infrequently in the faeces, relatively frequently in the throat. If we apply the argument used for the haemolytic group we might be inclined to simply divide the series into the faecal group, and the rest (*mitis*, *salivarius*, *ignavus*), the division between these last three being again academic rather than real.

I now want to touch upon my own work in this direction.[3] Classification in the streptococcus genus at the present time must be a question of groups. We meet with a graded series, at one end of which we have organisms possessing almost all the possible properties, and at the other similar ones possessed of no other common property with the genus than their morphology. Instead, however, of following the curve of normal variation, which would be the case if the possible properties were scattered by chance over the series, we find, if we plot out the number of types against number of properties, that there are several peaks on our curve which represent a definite and recurring tendency for the association of certain properties; and that each of these represents a centre of variation around which an association of certain properties is grouped, which association may be taken to define a type. I have specially worked at this association in respect of the organisms found in the faeces, and have endeavoured to show that it is constant, and, reduced to a mathematical formula, is a real association. This method can be briefly alluded to here.

TABLE IV.—*Association of Properties within the Universe N.*

	H.	h.	R.	r.	M.	m.	C.	c.
Number of individuals within the series possessing each attribute	*85*	*49*	*23*	*111*	*75*	*59*	*34*	*100*
H (Heat resistance) ...	—	—	*4*	*81*	*69*	*16*	*3*	*82*
h (Heat not resisted) ...	—	—	*19*	*30*	*6*	*43*	*31*	*18*
R (Raffinose fermented)..	(14.6)	(8.4)	—	—	*7*	*16*	*9*	*14*
r (Raffinose not fermented)	(70.4)	(40.6)	—	—	*68*	*43*	*25*	*86*
M (Mannite fermented)...	(47.6)	(27.4)	(12.9)	(62.1)	—	—	*3*	*72*
m (Mannite not fermented)	(37.4)	(21.5)	(10.1)	(48.9)	—	—	*31*	*28*
C (Chain formation) ...	(21.6)	(12.4)	(5.8)	(28.1)	(19.0)	(15.0)	—	—
c (Chains not formed; diplococci)	(63 4)	(36.6)	(17.1)	(82.8)	(56.0)	(44.0)	—	—

N. Total number in the series = 134.

The figures in italics are the actual observed figures. The bracketed figures in ordinary type are those calculated for the case of independence of the properties studied in this table, and are given for purposes of reference.

If a series of organisms is taken haphazard from the faeces and their various properties are worked out and charted as is done in Table IV, putting the properties into rows and columns, and noting these as present or absent, one is readily able to see which properties tend to go together. The positive properties are indicated by the capitals, the absence of these by the small letters; thus out of the 85 heat-resisting (H) organisms we find that four of these are R—that is, ferment raffinose. The table shows, in addition, what the association would be in the case of chance alone being at work—in this case 14.6, or nearly four times what we actually find. We therefore conclude that there is a negative association between these properties, and that whatever it is in the complex make-up of the organism which enables it to withstand heating is associated with an innate inability to ferment raffinose. To take one more example. The association of heat-resisting (H) with chain formation (C). Of the 85 H only three are (C). The chance association would be 21.6—that is, seven times greater; again the inference is that some definite character essential to the organism causes the divorce of these properties and, conversely, the association of their other sides—namely, sensitiveness to heat and chain formation.

For any of these properties Yule's coefficient of association[4] may be worked out, which is a measure of the degree of association used by statisticians, and having values between 0 and + or − 1, and denoting association or dissociation as the case may be. When the value is +1 it denotes that the one property invariably conditions the other, and it is found that some of these values show a very high degree of association in the properties under consideration. Such mathematical treatment is, I think, desirable, as it gives us a definite value for any properties we may choose to be used to form lines of division into types; it further shows that many of the suggested ones are valueless.

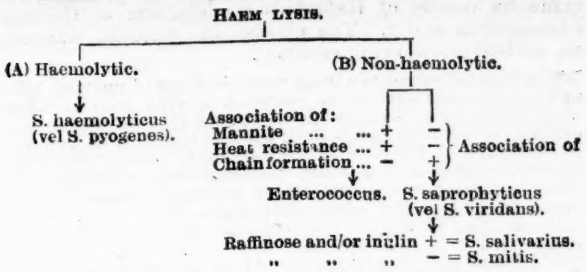
Having touched upon the way in which I am of the opinion criteria for classification should be examined, I wish to go on to the consideration of the value of such tests from the point of view of their permanence. Obviously this is the critical point upon which the whole question turns. If an organism changes its reaction within a few days or weeks of isolation the tests become largely useless. I should like to deprecate experiments directed towards showing that this is the case, which expose the organisms to conditions of growth which are of a rather bizarre nature. These are biologically of great interest and importance, but have little bearing on the problem in hand. What we require to know is whether the organisms, when pure and kept growing in ordinary media, such as agar or broth, preserve their reactions for any length of time.

I think that the truth lies between the two extremes which have been taken up. Neglecting such incidental errors as impure cultures, which undoubtedly will occasionally creep in and are especially hard to exclude when we are dealing with morphologically similar organisms, it can be definitely stated that the type of coccus with which this work has been especially carried out, and which I prefer to call the enterococcus, does retain its characters to quite a remarkable degree when kept in ordinary culture media. And similarly the writer is satisfied that some of the other varieties, in particular the virulent ones, do change their fermentative properties. Fortunately the bulk of these are haemolytic, and the property of haemolysis is a pretty constant one. Given that haemolysis is constant, that the sugar reactions of the enterococcus group are constant, we can, I think, usefully divide the streptococci into the following groups, which fairly indicates the present position of the subject. (See the working scheme of classification, Table V, p. 791.)

I am content that streptococcus classification must be an affair of groups, and that the most we can usefully do is to place any individual organism within one of the groups, and that to attempt more is at present often undesirable.

I would also beg those who are working at any new lines of classification to homologize their work with what has already been done. If not, and if they rush into new systems of classification of their own, they

TABLE V.—*Working Scheme of Classification.* (J. H. D.)



The term "Saprophyticus" is preferable to "S. viridans," as the latter includes (according to its general usage) many strains which are inert towards blood. The division into "Salivarius" and "Mitis" types is probably not of much importance.

tend to make confusion worse confounded in a subject whose curse is the multiplicity of systems proposed for its simplification.

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DISCUSSION.

Dr. J. W. McLEOD (Leeds), in opening the discussion, said: What I have to say refers chiefly to the question of virulence amongst streptococci. Although it is undoubted that the non-haemolytic streptococci have a considerable pathogenic rôle, there is as little doubt that in most instances the higher degrees of virulence are exhibited by the haemolytic streptococci. By haemolytic streptococci are meant only such varieties as will, when grown in bouillon for eighteen hours, produce a haemolysin which can be detected by incubating a small quantity of the culture fluid with a suspension of blood in 0.9 per cent. saline for three-quarters of an hour.

There has been a prolonged controversy, especially amongst German obstetricians and gynaecologists, on the question whether haemolytic activity may be accepted as evidence of virulence in any given strain of streptococcus. This work was summarized in a paper published in 1914 (*Journ. Path. and Bact.*, 1915, xix, 392) in which I claimed that in experimental work on rabbits, at all events, it was possible to single out a streptococcal strain as highly virulent if it had the property of producing haemolysin freely and rapidly when the fluid medium used for its growth was undiluted rabbit serum. Since then I have done some work in testing streptococcal strains derived from various lesions in man as to their power of producing haemolysin freely when grown in undiluted human serum.

The technique adopted after a number of trials was to inoculate with a twenty-four hour subculture on agar of the strain under investigation a medium consisting of equal parts of peptone broth and fresh human serum and then to subculture from this at the end of twelve to sixteen hours' incubation to undiluted human serum, which was then incubated. A positive result consisted in the demonstration of haemolysin production in the pure serum culture after twelve to sixteen hours' incubation. In all 23 strains were tested, and of these 5 gave positive results.

The sources of the strains giving positive results, and the results of testing at various dates, were as follow:

1. Meningitis (fatal) following trauma: Positive results in July, 1918; twice in January and twice in March, 1919; in November and December, 1919; trace in February, 1920; nil in July, 1921.

2. Septicaemia (fatal) following infected haemothorax: Positive result at first test in January, 1919; nil later in the same month and at first test in March; at next test in March, 1919, partial.

3. Empyema (fatal) following influenza; marked *post-mortem* evidence of haemolysis. Trace at each of two tests in March, 1919; nil in February, 1920.

4. Meningitis (fatal) complicating nephritis: Strong positive result in October, 1919; still positive in November, and slightly so in December of the same year; nil in February, 1920, and also in July, 1921.

5. Pyaemia (fatal): Trace in October, 1919: nil in November of the same year.

Of the strains giving negative results five were from fatal injections; these were:

1. Prolonged septicaemia (strain had been for two or three years in subculture before it was tested).
2. Mixed septicaemia, streptococcus associated with *Vibrion septique*.
3. Cellulitis following compound fracture.
4. Septicaemia.
5. Septic endometritis following parturition.

The remaining 13 were from trivial or less serious streptococcal infections.

It is at all times difficult to judge of the virulence of a strain by the effect that it has produced in the human body on account of the many modifying factors. It is probably safe, however, to say that the greater number of virulent strains will be those associated with fatal lesions. It cannot be claimed for the criterion suggested that it singles out all dangerous strains; but the data so far as they go definitely suggest that a strain giving a positive result when tested in this way is a formidable one. It is generally believed that streptococcal strains lose virulence on subculture, and with this view the test considered is consistent, since all strains tested giving a positive result have sooner or later lost this property.

As a matter of fact, in the great majority of cases the degree of haemolysis produced is proportional to the amount of growth in the undiluted serum. If, then, this is an accurate test of virulence amongst streptococci (haemolytic) their virulence will depend mainly on two factors: (1) Power of rapid growth in unaltered body fluids of the animal species under investigation, and (2) power to produce toxin (haemolysin) when so grown. Of course, when different bacterial types, or even different species of streptococcus (haemolytic and non-haemolytic) are compared it is certain that no relationship between virulence and power of growing rapidly in human serum exists: but it does not follow that such a relationship may not exist amongst different strains of similar type.

A certain amount of experimental evidence has been brought forward to show that there is an association between the virulence of a streptococcus and its proteolytic capacity and power of using split protein. (Rosenthal and Patai, *Centralbl. f. Bakt. und Parasit.*, O., 1914 Bd. lxxiii, 406; and N. F. Foster, *Journ. Bacteriology*, 1921, vi, 210.) If an analogy exists between the hypervirulence of some streptococcal strains for rabbits (McLeod, *Lancet*, October 3rd, 1914) and of others for man, then it is unlikely that serum treatment, even with homologous serums, will benefit such infections in man.

Dr. H. WARREN CROWE (Harrogate) widened the scope of the discussion to include the non-haemolytic streptococci. He showed a medium composed largely of heated blood, by means of which the non haemolytic streptococci could be differentiated. With this medium it had been found that in the case of infected teeth and other foci, where streptococci were present in large numbers, a great many different varieties of streptococci could be demonstrated. He pointed out that the problem of vaccine treatment was greatly complicated by these findings, since, in the absence of any mode of determining whether one or more of these varieties was pathogenic, a vaccine must be made containing all the varieties found, and, if possible, in equal numbers.

Dr. W. FORD ROBERTSON (Edinburgh) maintained that growth upon haemoglobin agar furnished valuable criteria for the differentiation of streptococci, especially the distinction between soft and rocky colonies, haemolytic (strictly haemoglobinolytic) and non haemolytic action. If they added to these criteria, first, the distinction between long and short chains, which could almost always be made if a peptone broth with one-tenth part of sheep's serum added was used, and, secondly, the reactions in lactose, inulin and salicin test broths, the outlines of a serviceable classification began to appear.

Professor J. MARTIN BEATTIE, in reply, said he was very sceptical of any classification based on one or two characteristics only. Many years ago in Toronto he thought he had obtained a specific reaction for a special strain of

organism and was about to show the reaction at a meeting when he found that he could not reproduce it, although previously it had never failed to occur. He had never been able to produce that particular reaction since. He told this experience as an example of how fallacious it might be to rely on one particular phenomenon in attempting to classify bacteria. A useful classification was one which gave an idea of the pathogenicity of the strains or whether homologous serums could be used. A large number of organisms must be employed in the experiments before the results could be of value. In cases where serums had failed to protect, it often happened that no antibodies were present in them. Why antibodies should not be produced in some instances was not clear. Professor Beattie thought that vaccine treatment was not always responsible for the cures attributed to it. He cited two cases of meningitis, both of which appeared hopeless from the clinical point of view. An antimeningococcal vaccine was prepared for both, but, as it happened, only one case received any; both recovered. Had the vaccine been given to both cases their recovery would certainly have been attributed to its effects.

THE BLOOD PICTURE IN SCURVY, WITH PARTICULAR REFERENCE TO THE PLATELET.

BY

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IT is now generally accepted that in those pathological conditions which are accompanied by a diminution in the number of blood platelets a tendency to haemorrhage is almost always observed.

Already in 1910 Duke,[1] from the analysis of a large number of platelet estimations in different clinical conditions, arrived at the following conclusions: (1) When the platelet count descends below the level of 60,000 per c.mm. there is an abnormal tendency to bleed; (2) if the count falls below 10,000 this tendency is always present; and (3) when below 1,000 it is present in its most severe form. The production of experimental purpura in animals (Ledingham,[2] 1914) by means of an anti-platelet serum, and following on this the observation that anti-platelet serums alone of the antiblood-element serums were capable of producing this pathological picture (Ledingham and Bedson, 1915[3]), completed the chain of evidence.

In scurvy we have another clinical condition in which haemorrhage is a constant feature. The bleeding from the gums and the subperiosteal haemorrhages over the tibiae, the "black eye," these are all characteristic signs met with in the acute stages of the disease. In experimental scurvy in the guinea-pig the haemorrhages are sometimes so numerous as to recall vividly the picture produced in these animals by means of an anti-platelet serum. The question, therefore, naturally arose as to whether or not the platelets were reduced in numbers in the acute stages of scurvy. On searching through the literature the observations made on this point were found to be extremely scanty.

S. Wassermann[4] (1918), in a communication on the blood picture in scurvy as it occurs in man, remarks that the blood platelets are reduced in number in the acute stage, and increased in convalescence. Kirch[5] (1919) gives the findings in two cases, the platelet counts being 280,000 and 14,000 per cubic millimetre, corroborating the observations of Wassermann. However, no details of the technique used by these two workers in the counting of platelets is given, so that it is more or less impossible to judge of the accuracy of their observations. Furthermore, in the two cases of Kirch's, bleeding times of 3 and 2.7 minutes respectively are given, which makes his platelet counts even more difficult to accept. Hess[6] (1914), in a communication on infantile scurvy, states that the platelet count is normal and that the haemorrhages are most probably due to a decreased capillary resistance. In view of these contradictory findings it was decided to work out the picture in scurvy experimentally produced in guinea-pigs, paying particular attention to the platelet count.

Technique.

In the counting of red cells and leucocytes, and in making the differential leucocyte count, the usual technique was employed. The haemoglobin estimations were made by means of Haldane's modification of Gowers's haemoglobinometer. The number of platelets was estimated by the following method:

The skin (of the ear in most cases) is cleaned up with ether, and on the clean surface is deposited a large drop of diluent (the diluent employed consisted of 1 per cent. aqueous solution of brilliant cresyl blue 1 part, 2 per cent. sodium citrate in normal saline 6 parts). The skin is then stabbed, through the drop of diluent, by means of a sharp needle. The blood thus oozes directly into the diluent, which prevents clumping of the platelets, and at the same time stains them blue. With a platinum loop of convenient size some of the diluted blood is transferred to a slide and carefully covered with a cover-slip. The amount of blood taken should be sufficient to spread out evenly between the slide and cover-slip without causing the latter to float. The preparation is ringed with vaseline. The number of platelets and red cells is then counted in several fields of the preparation (Leitz 7, ocular 3), and the ratio of platelets to red cells determined. Having already determined the number of red cells per cubic millimetre, the actual number of platelets is readily arrived at.

Experimental Data.

A series of four guinea-pigs was put on a diet of bran, oats, and water only (no green food or autoclaved milk), it

TABLE I.

Date. 1921.	Weight Grams	Red Cells.	Leucocytes.	Platelets.	Remarks.
GUINEA-PIG B. 41.					
Jan. 24 ...	—	4,864.000	5.600	600,000	
,, 27* ...	295	5,168 000	4,000	781.000	
,, 31 ...	320	5,920,000	6.600	883.000	
Feb. 3 ...	310	6,496 000	8,200	713 000	
,, 7 ...	280	7,888,000	5,000	1,655,000	Not lively; coat rough.
,, 10 ...	270	6,566,000	4,400	1,042,000	Unchanged.
,, 14 ...	280	6,896.000	4.000	1.275.000	,,
,, 17 ...	225	5,536,000	4,600	748,000	,,
,, 19 ...	210	—	—	—	In moribund state.
GUINEA-PIG B. 42.					
Jan. 24 ...	—	5,470,000	7,000	824.000	
,, 27* ...	325	6,066,000	11,200	797,000	
,, 31 ...	310	6,928,000	10,200	1,130 000	
Feb. 3 ...	330	6,896,000	9,400	1,320.000	
,, 7 ...	270	7,584,000	6 400	1,547.000	
,, 10 ...	290	6,272 000	12,800	896.000	
,, 14 ...	300	6,480,000	11,600	841.000	
,, 17 ...	260	5,024,000	9,000	913,000	Quiet; out of condition.
,, 19 ...	270	5,472,000	6,400	781,000	
,, 21 ...	260	5,536,000	6,000	779,000	Looks ill.
,, 22 ...	250	5,344,000	—	785.000	Unchanged.
,, 23 ...	240	4,960,000	—	82 ,000	,,
,, 24 ...	220	—	—	—	In dying condition.
GUINEA-PIG B. 43.					
Jan. 24 ...	—	5,766.000	10,600	784,000	
,, 27* ...	280	5,152 000	5,000	792 000	
,, 31 ...	300	7 986,000	6,600	1,477,000	
Feb. 3 ...	320	6,360,000	7,200	936,000	
,, 7 ...	260	7,072,000	4,800	1,100,000	
,, 10 ...	300	5,808,000	6,200	735,000	
,, 14 ...	270	5,504,000	6 000	797,000	
,, 17 ...	225	6,016,000	4,800	761,000	Quiet; out of condition.
,, 19 ...	200	4,848,000	7,200	673,000	Very ill.
,, 20 ...	—	—	—	—	Died during night.
GUINEA-PIG B. 44.					
Jan. 24 ...	—	5,680,000	8,000	800,000	
,, 27* ...	430	6,144.000	6 000	739 000	
,, 31 ...	410	6,864.000	4,300	1,183 000	
Feb. 3 ...	410	6,624.000	11,000	973,000	
,, 7 ...	340	8.000,000	5.400	754.000	
,, 10 ...	390	5,968 000	7,000	575.000	
,, 14 ...	360	6,352,000	4,600	907,000	
,, 17 ...	325	5,648,000	3 600	910,000	Looks ill.
,, 19 ...	300	6,208.000	6,000	886,000	Unchanged.
,, 21 ...	270	5,200.000	6,800	675,000	Very ill.
,, 22 ...	—	—	—	—	Died 10 a.m.

* Put on diet of bran, oats, and water *ad lib.*

Differential Leucocyte Count.—This showed fluctuations such as might be met with in normal animals—no constant or striking change. No lymphocytosis, relative or absolute, was noted.

Post mortem Findings.—Guinea-pig B. 41: Some swelling of costo-cartilaginous junctions; small haemorrhages in intestines; suprarenals congested, small haemorrhages. Guinea-pig B. 42: Small haemorrhages in gums; swelling of costo-cartilaginous junctions; large intestine shows one or two haemorrhages (¼ in. in diameter); haemorrhages in thigh muscles. Guinea-pig B 43: Swelling of costo-cartilaginous junctions well marked; haemorrhages in both large and small intestine; suprarenals show some petechial haemorrhages. Guinea-pig B. 44: Swelling of costo-cartilaginous junctions; small haemorrhages in intestines.

having been shown that such a diet produces acute scurvy with death in the guinea-pig in about three weeks' time (H. Chick, E. M. Hume, and R. F. Skelton[7]). Blood estimations were made before the commencement of the experiment and at intervals of three to four days during its course.

These guinea-pigs lived for periods ranging from twenty-six to thirty-one days on the scurvy diet, and also show an appreciable loss in weight, roughly one-third of their original weight. *Post-mortem* the findings characteristic of scurvy were noted, though it must be admitted that these were not as severe as they usually are. The teeth were loose, there was some "beading" of the junction of the costal cartilages with the true ribs. Both small and large intestine showed some small haemorrhages, and the suprarenals were congested and showed some small petechial haemorrhages. The bone marrow of the femur was of the red active type.

As regards the blood picture, no change of an outstanding character has occurred. The red cells are apparently increased in what we might term the "prescurvy" period, dropping again to normal count at death. The platelets show the same increase and subsequent decrease. Even shortly before their death, when the animals were very weak, the platelets were normal in number. The total and differential leucocyte counts show nothing worthy of note. These findings, it must be admitted, were somewhat unexpected, as a drop in the platelet count was confidently anticipated. However, about this time, through the kindness of my colleague, Dr. Harden, I was able to make some platelet counts on monkeys suffering from experimental scurvy, which bore out the results obtained in the guinea-pig.

TABLE II.—*Platelet Count of Monkeys suffering from Scurvy.*

Date.	Red Cells.	Platelets.	Platelet Ratio.	Remarks.
MONKEY I. Feb. 24, 1921	4,208,000	576,000	7.3	Gums fungating; some bleeding. Teeth loose. Avoids use of hind legs (subperiosteal haemorrhages). Pallor of face.
Mar. 8, 1921	4,352 000	800,000	5.5	Condition more severe. Proptosis of right eye.
MONKEY II. Feb. 24, 1921	5,737,000	735,000	7 8	Condition not so acute as in Monkey I. Few haemorrhages to be seen in gums.
MONKEY III.* Feb. 26, 1921	4,560,000	600,000	7.6	

* Monkey III was the normal control animal.

Both these monkeys, though showing the typical picture of acute scurvy, gave more or less normal platelet counts. In Monkey I, in which the condition was the most acute, the red cells show a slight drop, whilst in Monkey II the red count is above that obtained in the normal control. Wassermann, in the paper already referred to, states that the red cells are sometimes slightly below the normal number, whilst in other cases a high red count up to seven millions is obtained. It is difficult to understand why an increase in the number of red cells should be met with in this disease, unless it is due to a diminution in the total volume of the blood. If this were so, the normal total leucocyte counts noted in the case of the scorbutic guinea-pigs would in reality represent a leucopenia.

In conclusion, the observations made in the case of two infants might be of interest, as pointing to a practical application of these experimental findings, and at the same time further supporting the contention that the platelets are not affected in scurvy. It is through the kindness of Dr. D. H. Paterson, of the Children's Hospital, Great Ormond Street, that I have had access to this material and am able now to publish these figures. They are tabulated below (see Table III).

In both these cases a diagnosis of scurvy had been made, though it must be admitted that in case R. E. there was some doubt as to the correctness of this view. When, however, the additional evidence afforded by the platelet count was available it was at once seen that the two cases were essentially deficient. In R. E. the platelet count was found to be very low, and this fact, taken in conjunction with the low red count and evidence of a bone marrow reaction, confirmed the doubts felt as to the original diagnosis of scurvy, and it was changed to one of purpura haemorrhagica. The second case, F. S., in which there was little doubt as to the true condition, gave a normal platelet count and a red count slightly below the normal. The subsequent history of these cases bore out the revised diagnosis. Both children received antiscorbutic treatment. R. E. died in the course of a few days, with *post-mortem* findings in keeping with the diagnosis of purpura haemorrhagica, whereas F. S. made a rapid recovery.

TABLE III.

Case.	Age.	Bleeding Time.	Red Cells.	Platelets.	Platelet Ratio.	Blood Smear.
R. E.	1½	++	3,248,000	60,000	53.3	Nucleated red cells. Polychromatophilia. Anisocytosis.
F. S.	10/12	Normal	4,000 000	560,000	6.8	Nothing abnormal seen.

Note.—R. E. had haemorrhages (skin) scattered all over the body; bleeding from mucous surfaces; subperiosteal haemorrhages (tibiae); a bruise 1 in. in diameter over the right eye. F. S. had bleeding from the gums, subperiosteal haemorrhages, and proptosis of both eyes.

Conclusions.

1. In scurvy produced experimentally in guinea-pigs and monkeys and in one human case the platelets were found to be normal in number. It is possible that very transient fluctuations in the platelet count occur in scurvy, and that it is during this period of platelet deficiency that the haemorrhages occur. It is hardly conceivable, however, that in making a comparatively large number of platelet observations such fluctuations should have been completely overlooked. Demmer[8] cites a case of purpura haemorrhagica in which fluctuations in the platelet count, preceding the outburst of haemorrhages, occurred in a most regular manner.

2. The red cells in some cases showed an increase in number, this condition coinciding with a "prescurvy" or incipient scurvy stage. In the acute stages of the disease, particularly where haemorrhages were numerous, the number of red cells fell to slightly below the normal.

3. No variations in the total and differential leucocyte count were observed.

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CHRONIC DUODENAL ILEUS.

BY

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I VENTURE to bring before a meeting of pathologists some observations on a condition which I believe to be a pathological entity, but which in the *post-mortem* room may readily escape notice unless definitely looked for. We are all probably familiar with the findings in a case of death from acute gastro-mesenteric ileus, in which enormous distension of the stomach and duodenum is found, the distension ending, as a rule, opposite where the superior mesenteric vessels cross the duodenum. Such cases, although usually occurring after an abdominal operation, and most frequently after operation on the biliary tract, occur also independent of any operation.

In a long series of examinations of the duodenum in the *post-mortem* room in search of diverticula I was struck by certain cases where a greatly dilated and congested duodenum was found, the dilatation extending as far as the crossing of the superior mesenteric vessels. In the histories of these cases no significant symptoms were

recorded which could be correlated with the pathological condition found.

The rapidly fatal course of duodenal obstruction experimentally produced in animals leads one to anticipate that any degree of duodenal obstruction in the human subject should be accompanied by very definite symptoms and interference with the health of the individual. The necessary proof was forthcoming in the case of an old woman who, after suffering from long-standing gastric symptoms, the chief of which was vomiting, finally developed, without obvious exciting cause, acute gastro-mesenteric ileus which proved fatal. At the *post-mortem* examination there was found enormous distension of the stomach and the first three parts of the duodenum up to the mesenteric vessels, beyond which the gut was empty and collapsed. A second case in which there was also present a duodenal ulcer, for which a posterior gastro-enterostomy had been performed, the patient continuing to vomit and dying in a state of inanition and collapse, also showed the same duodenal dilatation up to the crossing of the mesenteric vessels.

The possibility of clinical diagnosis of the condition was furnished, however, by a subsequent case in which the patient, a woman aged 34, gave a history of gastric trouble since childhood, with periodic bilious attacks, associated with chronic flatulent distension in the epigastric region, and, latterly, progressive emaciation. At operation, the distension of the stomach and the duodenum up to the root of the mesentery was so great as to make its recognition unmistakable. The obvious line of treatment was an anastomosis between the dilated third part of the duodenum and the first loop of jejunum, and this operation was followed immediately by complete relief of all her symptoms.

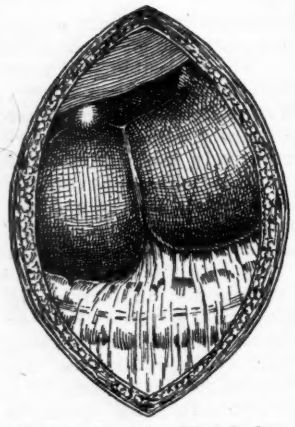

FIG. 1.—Greatly dilated duodenum and pylorus as seen at operation. Ulcer on lesser curvature of stomach just showing beneath liver.

Since then I have met with and successfully treated four similar cases. In Fig. 1 is represented the dilated duodenum seen on opening the abdomen. This necessary contribution from the pathology of the living may, I hope, make the recognition of the milder degrees of the condition in the *post-mortem* room possible, for only there can its relation to other morbid conditions in this region be fully established.

Etiology.

In the normal human subject the duodenum is slightly constricted where it crosses the vertebral column (Fig. 2), behind the superior mesenteric artery. Dwight in his wax casts of the duodenum showed how the degree of constriction may vary within the limits of the normal. A congenital abnormality in the relation of the superior mesenteric artery to the duodenum might quite conceivably lead to an exaggeration of the normal constriction sufficient to interfere with function.

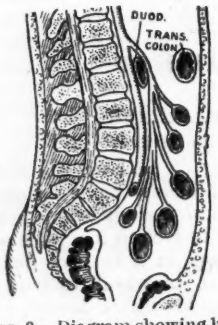

FIG. 2.—Diagram showing how duodenum may be compressed behind root of mesentery when small intestines sag downwards.

Were a congenital cause operative, then one would expect to find every now and then a case where in early life well-marked obstructive symptoms were recognizable. Such is the case, for both Downes and Dubose have reported cases of megaduodenum in infants, in which at operation no organic stricture of the duodenum was discernible and in which the dilatation extended as far as the crossing of the mesenteric vessels.

It can be shown on the cadaver that any factor which causes a direct downward pull on the mesenteric vessels almost completely occludes the duodenum. During life it has been shown that when the empty small intestines sag into the pelvis, the mesentery folds like a fan, and if the latter is not of sufficient length to allow the intestines to reach and rest on the pelvic floor, a considerable drag occurs on the mesenteric vessels. A lax abdominal wall and a certain degree of visceroptosis are the essential factors in such a case. Apart altogether from general visceroptosis, however, we meet with cases in which there is a congenital lack of fixation of the proximal colon and the caecum and ascending colon prolapse into the true pelvis. In such cases, especially if the caecum is allowed to become loaded, a drag on the superior mesenteric artery and on its right colic branch may cause a greater or less degree of duodenal compression.

In two cases in which I operated for symptoms of duodenal obstruction the cause was found to be prolapse of the proximal colon. A colopexy was followed in each case by pronounced relief of all symptoms.

Morbid Anatomy.

The dilatation in the duodenum is the most striking feature of the condition. This usually, but not invariably, is associated with dilatation of the stomach. The wall of the duodenum is thicker than normal, mainly from muscular hypertrophy. The pylorus may be either widely dilated, admitting three fingers readily, or it may have retained its tone and appear normal. The small intestines will be empty and will occupy the true pelvis, and if dislodged by traction on the mesentery they come out with an audible "pop." In some cases, however, as previously mentioned, it is the caecum and part of the ascending colon which occupy the true pelvis and exercise the mesenteric pull.

Consequences of Duodenal Ileus.

The obstruction may become complete, when the picture of acute dilatation of the stomach with intense toxaemia and collapse and fatal termination follow unless promptly relieved. Short of this, the subjects of chronic duodenal ileus suffer from chronic flatulent dyspepsia with periodic bilious attacks; in fact, I think we have in this periodic accentuation of a duodenal obstruction the pathology of a bilious attack. Some catarrhal change in the duodenal wall almost certainly accompanies such an attack. It is significant that of the eight cases of chronic duodenal obstruction which I have so far investigated three have had in addition a chronic duodenal ulcer and one a chronic gastric ulcer. This association of ulcer and duodenal dilatation has also been noted by Kellogg, and it seems likely that the chronic stasis in the duodenum predisposes to ulceration, as Lane has maintained for many years.

Further, in a case of fatal acute gastro-mesenteric ileus following an operation for removal of gall stones from the common duct, it was observed during life that duodenal content was coming from the biliary fistula. This suggested that a previous chronic duodenal obstruction may have had some etiological relationship with the infection of the biliary passages and the calculus formation.

Likewise, in a case of death from acute haemorrhagic pancreatitis I found a similar duodenal dilatation, and it appeared that entrance of duodenal content into the pancreatic duct had activated the pancreatic ferments. I do not suggest that this is the invariable or even the usual sequence of events, for in other cases of acute pancreatitis no such duodenal dilatation has been found. I merely state the fact as one worthy of investigation in other cases.

In one other condition the presence of chronic duodenal ileus may have an important bearing, namely, in rapid death following the perforation of a duodenal ulcer. It is the common experience of surgeons that perforated duodenal ulcer is a condition with a relatively low mortality when operation is undertaken within twelve hours of the perforation. Occasionally, however, a patient is brought for treatment within a few hours of the rupture in a state of profound shock and collapse, from which he does not rally. In one such case which I investigated the patient, a young man, died within twelve hours of the onset. *Post mortem* there was found a greatly dilated and congested duodenum, which had apparently emptied itself through a relatively small perforation. The explanation I suggest is that in such cases the escape into the peritoneal cavity of a

considerable quantity of the toxic content of a partially obstructed duodenum gives rise to the profound symptoms of shock and toxaemia, which are almost anaphylactic in character and resemble closely the condition which one is accustomed to see in animals with a closed duodenal loop.

It would be out of place for me here to enter more fully into the clinical aspects of this subject, and I would in conclusion summarize the following points:

1. Chronic duodenal ileus is a clinical and pathological entity.
2. It is usually found in female subjects with a certain degree of visceroptosis, or in male and female subjects with a floating proximal colon.
3. It is probably the predisposing cause to acute dilatation of the stomach, both post-operative and spontaneous.
4. It is the pathological basis of the recurring bilious attack.
5. It may be found in association with duodenal and gastric ulcer.
6. Its relationship to chronic biliary and pancreatic infections, whilst not yet established, is worthy of further study.
7. In cases of rapid collapse and death after the perforation of a duodenal ulcer the signs of chronic duodenal obstruction should be looked for.

DISCUSSION.

Dr. JOHN CRUICKSHANK (Aberdeen) said that the condition was new to him until a short time ago, when he had discussed it with a surgeon in Aberdeen. The surgeon in question blamed the pathologists for not having recognized it *post mortem*.

Professor M. J. STEWART (Leeds) said that the condition described by Mr. Wilkie was difficult to recognize in the *post-mortem* room. The intestine varied a good deal in size after death, and unless attention was called to the condition from the clinical side it might be missed. He asked whether hypertrophy of the duodenum was always present.

Dr. J. F. GASKELL (Cambridge) had not observed the condition in his *post-mortem* experience. Mr. Wilkie had spoken of blowing up the duodenum with air. Was the condition obvious in the collapsed duodenum before it was blown up?

Dr. J. H. DIBLE (Manchester) asked whether laxity of the pylorus had anything to do with the condition. If air was blown into a normal stomach, would not the pylorus prevent its passage into the duodenum?

Mr. D. P. D. WILKIE, in reply, said that he had not intended any reflection on pathologists by his remarks. The intestines varied very much *post mortem*, and he thought that in the absence of clinical symptoms the condition would not be recognized. The clinical evidence was, however, definite. Hypertrophy should always be present. He thought it was a weak point in Lane's theory that no hypertrophy of the bowel wall was found above the kinks. In his cases thickening of the duodenal wall was a constant feature. Blowing up the stomach with air as a test of the condition was apt to be fallacious. It could only be used to confirm clinical evidence. But it made operation very much easier, and that was why he used it. The pylorus was not always patent. Among his cases there were two types: In (1) the pylorus was patent and vomiting was a feature; in (2) the pylorus was tonically contracted, and the patient had nausea but did not vomit until after twenty-four hours. The effect of blowing in air varied in the two types.

EXPERIMENTAL TAR CANCER IN MICE.

(Abstract.)

DR. JAMES A. MURRAY (Director, Imperial Cancer Research Laboratory, London) gave an account of the work done, in conjunction with Dr. W. H. Waglam, on experimental tar cancer in mice. He began with a brief outline of the history of experimental cancer research. Yansen and Burrell had first succeeded in transplanting tumours. But they and their immediate successors dealt with fully developed cancer. Later a variety of methods were devised to try and show how cells became cancerous. Chronic irritants, such as *x* rays and animal parasites, had been extensively used. What was wanted, however, was a method which would produce uniform results.

Japanese observers had found that it was possible to produce cancer by painting with tar. The defect of their work lay in the fact that they brought forward no particular standard as to what constituted a malignant tumour. It was true that there was no pathological criterion by which malignancy could be judged. Histological examination was only a rapid method of discovering dissemination. Workers with tar produced lesions which resembled squamous carcinomata of the skin. To prove malignancy the observer looked for extension of growth beyond the boundaries of the epithelium, and continued growth when the irritant was removed. The method used by Dr. Murray's predecessors was not quite satisfactory. They kept the animals alive as long as possible and then tried to find metastases.

Dr. Murray's method was as follows: He applied tar to a skin area in mice two or three times a week for several months. The area chosen was the back of the neck, since here the animals were unable to get at it to scratch. The applications need not be very regular. The tar could be applied at any convenient time while carrying on with other work. After a few months warty growths would begin to appear in some animals, and they increased in size as long as they were painted. To prove that malignant change had taken place autologous inoculation was performed. When a benign tissue was inoculated into the same animal growth ceased after a time; a malignant tumour, provided it was not too septic, grew progressively. By using this method it became possible to diagnose malignancy much sooner and to study the early stages of cancerous growth.

Dr. Murray then showed drawings and slides of squamous carcinomata produced in mice by this method. There were no mammary tumours in this series of mice, which was curious when one remembered how frequent such tumours were.

Dr. J. F. GASKELL (Cambridge) commented on the vast amount of work which had been done to solve this prime problem of pathology. The difficulties were immense because there had been no satisfactory method of dealing with the matter. Dr. Murray's work was epoch-making in that it pointed to a method which might prove reliable in the study of cancer. He would like to ask a question—tar was an antiseptic and sterilized the medium in contact with it—could experiments be done in an aseptic manner so as to eliminate any possible septic factor in the production of cancer?

Dr. W. FORD ROBERTSON (Edinburgh) said that the observation of the increase of malignancy of the epithelial new growth on transplantation from the original site was, he thought, one of much importance. It did not, however, throw any light upon the question of causation of malignant growths. It was well known that a water soluble extract made from tar acted as a powerful "auxetic," and it might be that the consequent proliferation of the epithelial cells over a long period, in the experiments described, rendered them more vulnerable to the attack of an infective agent which was the true cause of cancer.

Dr. ARCHIBALD LEITCH (London) said that one of the difficulties of cancer research was that spontaneous tumours were very liable to develop during experiments. In his series of mice tar had been applied to the groin, and it was very difficult to avoid putting some on the mammary gland. Several of his mice had developed mammary tumours. He could not conceive that bacteria had anything to do with the formation of tumours in his cases. Carcinoma could not be diagnosed with certainty by pathological methods. Though certain microscopical appearances might be associated with malignancy, this could not be said to be a constant finding, and the only criterion was a clinical one. Even if we could transplant tumours in man the result would not give us certain knowledge as to the nature of the growth. He did not agree

with Dr. Murray that only malignant tumours grew on transplantation, and cited an instance of innocent adenomyoma of the uterus which had done so.

Dr. JAMES A. MURRAY, in reply to Dr. Gaskell, said that sterilization would be an ideal method, but was not possible to carry out in the animal body. It might, however, be possible to sterilize cells cultivated *in vitro*. One could not protect the deep surface of an experimental area from saprophytes. He agreed with Dr. Leitch that no definite line could be drawn between malignant and benign tumours.

DEMONSTRATIONS.

PROTEIN SKIN TESTS IN ASTHMA.

IN the Pathological Department of the College of Medicine, on July 20th, Dr. MACKENZIE WALLIS demonstrated the cutaneous reactions with various proteins. He had grouped several closely related types of protein together and combined them into six tests. For example, all the various animal proteins, including epidermal, fur, feathers, etc., were used together. If a positive skin reaction was obtained the particular type of protein causing this reaction had then to be determined separately. The skin was cleansed with alcohol or ether, and a small drop of an alkaline solution of the group proteins placed upon it. With a sharp knife or needle the skin is scratched sufficient to break the skin surface without producing bleeding. A positive reaction shows in a few seconds by a zone of hyperaemia spreading outwards from the area tested. This is followed in from twenty to thirty minutes by the production of a definite urticarial wheal.

In many cases of asthma the patient was found to give positive reactions to one or more groups. The largest proportion of cases reacting to these skin tests were found to be sensitive to pollens. In the animal group of proteins feathers appear to be most prominent. Care had to be taken to avoid producing too severe a reaction in a highly sensitive person, and the tests should not be done immediately after an acute attack.

RENAL FUNCTION TESTS.

In the Pathological Department of the College of Medicine, on July 22nd, Dr. MACKENZIE WALLIS demonstrated micro-chemical methods of estimation of urea in blood, sugar in blood, and sugar in urine. These methods possessed the advantage that they could be easily applied without any inconvenience to the patient. Small quantities of blood were required for these estimations, and this could be obtained by a simple prick of the finger. The blood could either be weighed by absorbing it on specially prepared filter paper, and weighing on a torsion balance, or the blood could be drawn up into small graduated pipettes.

The blood was extracted with distilled water, and estimations of urea and sugar made upon the extracts. The use of the tungstic acid method of precipitation of blood proteins devised by Folin and Wu in America rendered such observations possible. It was possible to make an estimation of the blood urea and blood sugar in a very short time; the estimation of the urinary sugar content could be carried out simultaneously. With these methods it was possible within the space of one hour to obtain considerable information which was of value in diagnosis of renal insufficiency.

THE *Journal of the American Medical Association* reports that among the precautions taken during an epidemic of diphtheria and scarlet fever at Monon, Indiana, public meetings had been prohibited, all schools closed, and no child under 16 years of age was allowed in the streets.

IT is reported that during the first six months of 1921 31,885 births have been registered in Paris, while for the whole twelve months of 1913 there were only 48,746; in 1913 there were 31,916 marriages in Paris, while 26,282 took place during the first six months of 1921.

BY recent legislation in Chile owners of factories employing fifty or more women over 18 years of age must, within six months, provide day nurseries for the children of their employees; plans must be approved by the health authorities; not more than twenty-five children may be placed in any one room, which must be in charge of a competent person paid by the employer.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

LOCAL ANAESTHESIA IN THE REDUCTION OF FRACTURES.

THE reduction of fractures under local anaesthesia was first attempted by Conway in 1885, and was reported on by Lerda and Quénu in 1907 and 1908, but the method has not come into general use, probably owing to the fact that, at first sight, the injection of any solution into the bruised tissues in the vicinity of a recent fracture appears to be risky. However, in the following small series of cases in which the method has been given a trial no untoward result has occurred, and in every case the reparative processes have proceeded normally.

Technique.

The injection is made around the site of fracture with a 10 c.cm. or 20 c.cm. Record syringe, the last two or three cubic centimetres being injected before the fractured ends of bone. This can generally be done from two skin punctures so situated as to avoid important structures. The solution used is 1 per cent. novocain. to each 10 c.cm. of which is added one drop of adrenaline chloride solution (*B.P.*); the amount injected varies from 10 to 60 c.cm. It is essential that syringe, needles, and solution be sterilized by boiling—no other method of sterilization is admissible.

After five minutes the fractured ends of bone can be moved into position without pain, and a splint applied in the usual way. The limitation to the use of this method is the occasional difficulty in finding the exact site of the fracture; it is increased where there is swelling.

The following cases were treated in the casualty department of the Hampstead General Hospital:

Case 1.—H. B., chauffeur, aged 32, suffered an oblique fracture of the lower third of the right radius. It was twice reduced under general anaesthesia, and finally under local. The result was firm union, with good flexion and extension, but slight limitation of pronation.

Case 2.—E. W., a boy aged 13, had a transverse fracture of the lower third of the right radius with separation of the lower ulnar epiphysis. Considerable difficulty was experienced in finding the exact site of fracture. Novocain was twice employed, but, the position not being considered perfect, reduction was performed under nitrous oxide. The result was good union with full range of all movements.

Case 3.—P. L. P., a man aged 80 presented Colles's fracture of the right side with fracture of the ulnar styloid. It was considered that as he was very frail etherization would involve grave risk, and local injection was employed; reduction was effected without pain. Union is now firm, with good movements in all directions.

Case 4.—A. S., a butler aged 67, had an oblique fracture of the middle third of the shaft of the left humerus. He suffered from chronic bronchitis and marked emphysema. Local injection was successfully employed. There is firm union, with some limitation of extension of the elbow-joint.

Case 5.—T. P., aged 60, had a Colles's fracture on the right side. Reduction under novocain injected locally was painless. Union is now complete, but the wrist is rather stiff and finger flexion is not perfect.

The method is of value especially in cases where a general anaesthetic is contraindicated. A preliminary *x*-ray plate would in some cases be of very material assistance.

R. A. H. FULTON, M.B., Ch.B.N.Z.,
Late Resident Medical Officer, Hampstead General Hospital.

LOCAL ABSCESS FOLLOWED BY ERYTHEMA SCARLATINIFORME.

CASES of erythema scarlatiniforme due to septicaemia or pyaemia are not unusual, but we rarely find them associated with local abscess formation. Two such instances have come under my observation. The second, which I saw recently, proved perhaps the more interesting.

A boy, aged 11, having no previous history of erythema, was taken ill with febrile symptoms, sickness and slight vomiting, followed by a bright rash resembling that of scarlet fever. When I saw him the chest, back, and inner sides of the thighs were covered by the rash. The temperature was 99° F. The following day the temperature rose to 102° F. and the rash spread to the face. The fauces, soft palate, and uvula were congested, but the

tonsils were practically unaffected. There was no enlargement of the glands behind the sterno-mastoid. With a rash so intense I would have expected the patient to be more profoundly ill to justify the diagnosis of scarlet fever. On further examination a small abscess of the heel was discovered, with enlargement of the corresponding inguinal glands. The rash faded and entirely disappeared in a couple of days and was followed by a very slight desquamation of the skin. Later, the glands of the groin suppurated and from the pus evacuated *Staphylococcus aureus* was cultivated and a streptococcus which corresponded with *Streptococcus faecalis*.

Glasgow. F. ANDERSON MURRAY, M.D.

Reports of Societies.

LIVERPOOL MEDICAL INSTITUTION.

THE first ordinary meeting of the eighty-third session took place on October 27th, with the President, Dr. J. E. GEMMELL in the chair. Mr. EDGAR STEVENSON read a note on the treatment of septic ulcer of the cornea by chauffage, first described to him by Mr. Harrison Butler about twelve months ago. During this year Mr. Stevenson had treated a considerable number of septic ulcers of the cornea by this method with exceptionally good results, and he considered it far in advance of any other method of treatment. In addition to the rapid healing of the ulcer, an important point was that with chauffage the resulting scar was much thinner than that following healing by any other method. Dr. G. F. R. SMITH read an interesting note on post-anaesthetic complications.

Dr. DINGWALL FORDYCE read a paper on the significance and treatmen of some abnormalities of the urine in children. He held that thorough examination of a child includes chemical and microscopical examination of the urine, which might disclose the presence of pus cells and motile bacilli. These were never present in great numbers in a perfectly healthy child, but there were a considerable number of children, probably for the most part girls, whose urine was in this condition, and yet who were "fairly well." The bacilli belonged to one of the types of the coli group, and the exact site of the infection was impossible to determine in young children. He stated that the essence of both preventive and "therapeutic" treatment was correct diet and the avoidance or cure of septic foci. A common statement in the textbooks was that sugar was rarely found in the urine in children, but in a recent series of 100 unpicked cases of ailing children evidence of sugar in the urine was certainly present in 10. However slight and fleeting the positive test results might be, an explanation should be sought for them. In a large proportion of cases the presence of a positive test corresponded with indiscretion in diet or digestive disturbance, and disappeared on correction of such. In other cases a septic process was the cause. Clinically the experience in the matter of the connexion between acidosis and glycosuria pointed to laevulose being a common form of the sugar present. Cases in which glucose was the sugar present should be carefully watched and tested, with a view to counteracting any morbid tendency.

ANTIGONOCOCCAL SERUM.

AT a meeting of the North of England Obstetrical and Gynaecological Society held at Liverpool on October 21st, with the President, Mr. CARLTON OLDFIELD (Leeds), in the chair, Miss IVENS (Liverpool) read a paper on the use of antigonococcal serum as an adjunct to conservative surgery in gonococcal infections, basing her remarks on the results of its administration in 40 cases in the majority of which salpingitis had been the prevailing feature. Nicolle's serum from the Pasteur Institute had been employed. The serum was administered as follows: (1) By intraperitoneal injection during laparotomy. (2) By subcutaneous injection after dilution with normal saline. (3) By vaginal serum packs alternating with packs of 10 per cent. salt solution mixed with 5 per cent. carbolic lotion. It was pointed out that the administration of salt solution at the time of serum injection diminished the incidence of anaphylactic phenomena. In the majority of cases the pus tubes were opened up and 20 c.cm. of serum injected into them or left in the pelvis. The tubes were not removed unless very extensively damaged and the abdomen was closed without drainage. All the patients had made an immediate recovery and the results in cases of salpingo-oöphoritis, endocervicitis, and arthritis, and more especially in puerperal gonococcal infections, were excellent. A large number of cases had been followed up and were in good health, presenting a marked contrast to cases treated without serum. Three cases required further operation, but the possibility of reinfection was present. Miss Ivens considered that the results she had obtained warranted extended study and experiment with a reliable serum.

THE Harrogate Medical Society held its second meeting of the session at the Clinical Laboratory (by permission of Dr. Sinclair Miller and Dr. F. B. Smith) on October 20th. Dr. A. MANTLE presided and there was a large attendance of members. Part of the evening was devoted to the examination and discussion of pathological specimens from recent cases of clinical interest. Dr. MILLER read a paper on basal metabolism, and this was followed by a demonstration of the portable Benedict apparatus by Mr. KENDRICK of the Sanborn Company, London. Drs. BAIN, EDGECOMBE, SABERTON, BERTRAM WATSON, and others discussed the paper and the value of the apparatus as applied to clinical work.

Reviews.

THE CHEMISTRY OF COLLOIDS.

The Physical Properties of Colloidal Solutions,[1] by Dr. E. F. BURTON, is one of a series of monographs on physics edited by Sir J. J. Thomson and Professor Horton. The first edition appeared seven years ago; the second is now before us. The general form and scope have not been altered, but a large amount of fresh detail has been added to bring the work up to date.

The book deals with colloidal solutions from the physical standpoint, and attention is chiefly devoted to consideration of the ultramicroscope, the Brownian movement of particles and the optical properties of colloidal solutions; these subjects are dealt with very clearly and fully. The difficult question as to the nature of the surface forces responsible for producing the stability of colloidal solutions is dealt with more briefly, and the phenomena of adsorption in particular are very briefly dismissed. The final chapter of five pages on the application of colloidal solutions might well be omitted, for, as the author says in the preface, this is a topic which requires a treatise in itself. Special attention is given to those problems of colloidal solutions about which the existing knowledge is sufficiently definite to make possible a mathematical treatment; consequently it is chiefly concerned with suspensoid colloids and not so largely with emulsoid colloids. Those problems of colloidal chemistry which are of chief direct interest to the biologist receive relatively little attention. Nevertheless, the book will be found very instructive by the biochemist, for it gives an indication of the real extent of existing accurate knowledge concerning the properties of colloidal solutions. The biochemist and the physiologist have to work with living tissues which are an extraordinarily complex mixture of emulsoid colloids. The reactions occurring in the living tissues were inexplicable by the laws governing the reactions of true solutions, but the partially revealed laws of colloidal solutions suggest possible explanations for a certain number of phenomena hitherto obscure. Unfortunately, whenever a new form of energy is discovered there is a tendency to attribute to it all phenomena for which there is no other convenient explanation. The properties of colloids are uncertain, and the forces which exist on the surface of colloidal particles and determine their behaviour are imperfectly understood, yet there has been a strong tendency to explain all reactions of living tissues for which there is no other convenient explanation by saying that they are due to the colloidal state. Furthermore, the fact that all living tissues are composed of colloids, and the fact that colloidal solutions can behave in a very mysterious manner, have led to the wholly unwarranted idea that colloidal solutions ought to have special therapeutic virtues.

Dr. Burton's book is a very useful corrective to some of the rather loose ideas that have accumulated concerning

[1] *The Physical Properties of Colloidal Solutions*. By E. F. Burton, B.A., Ph.D. Toronto. Second edition. Monographs on Physics Series. London: Longmans, Green, and Co. 1921. (Med. 8vo, pp. 221; 18 figs. 12s. 6d. net.)

the properties of the colloidal state, for it states very clearly most of the really exact knowledge that we possess concerning the properties of the colloidal state. Medical science, like all other sciences dealing with living matter, is of necessity relatively inexact, and has to be content with laws that roughly cover a fair proportion of the observed facts, hence it is very useful to have the rather vague general laws in a subject such as colloidal chemistry examined by the physicist and submitted to mathematical treatment.

In his *Chemistry of Colloids*[2] Dr. W. W. TAYLOR deals with the behaviour of colloidal solutions from the point of view of the biochemist, and covers a much wider field than the book previously considered. The present is the second edition; the first edition, which appeared in 1915, was the first English textbook dealing with the subject. The changes in the present edition are chiefly matters of detail, but unfortunately the author has not brought his references up to date in all cases. This is particularly the case in the chapter dealing with the precipitation of colloids by electrolytes, in which case recent work has shown that the power of electrolytes to precipitate suspensoid colloids depends less directly on the valency than was previously supposed.

Dr. Taylor's book is divided into four parts—the general properties of colloids, the preparation of colloidal solutions, adsorption, and the applications of colloidal chemistry. As he has to deal with the general properties of colloidal solutions, he of necessity treats of problems concerning which our information is extremely imperfect. Many of these questions are very difficult to discuss briefly and intelligibly; on this account clarity of expression is all the more desirable, but this is not always attained—for instance, the meaning of the following sentence, which occurs on p. 8, is by no means clear: "This it is which points to the lyo rope character of the effect in the chemical reactions, the essential properties of the water, on which its behaviour as a solvent and as a dispersion medium depend, being changed to a fixed extent by these substances."

The chapters on the very difficult subject of adsorption are naturally not easy to follow, and matters are made worse by occasional slips. For instance, on p. 235 it is established in the letterpress that the static surface tension of a soap solution is less than the dynamic surface tension, but in the accompanying table the static surface tensions are shown as being greater than the dynamic surface tensions. The last portion of the book, on the applications of colloidal chemistry, is of special interest, and the chapter on biology is of particular importance to physiologists and pathologists. The conclusion, however, that oxygen and carbon dioxide are fixed in the blood by an adsorption process will not meet with general agreement. It would have been worth while in this chapter to have emphasized the fact—that since protoplasm is a colloidal substance, therefore every reaction which involves living tissues is a problem for colloidal chemistry.

VENEREAL DISEASE.

IN the third edition of Colonel L. W. HARRISON'S *Diagnosis and Treatment of Venereal Disease in General Practice*,[3] considerable changes and additions may be noted. The additions, however, have been effected without materially increasing the size of the work. To the introductory chapter, dealing with the routine of examination of the patient, has been appended a case sheet suitable for use in a venereal clinic. It is actually the form employed by the author in the St. Thomas's Hospital clinic. Labour has been reduced to a minimum by the use of rubber stamps and by recording lesions by the graphic method.

The chapter on the treatment of gonorrhoea in women has been considerably extended. The author is in favour of treatment "to assist drainage from the deeper tissues by procuring a diffuse outpouring of secretion without producing a slough." In other words, he prefers applications containing glycerin and a mild antiseptic to a strong solution which will cause a superficial burn without affecting tissues. He does not, however, subscribe to the somewhat passive line of treatment adopted by many authorities. Endometritis and metritis, except in the acute stages, may be treated, according to the practice of Kensington Infirmary, by direct applications of iodine to the uterine cavity. This is effected by passing a rubber catheter through the cervical canal, after careful sterilization, and gently syringing out with iodine liniment. In deciding whether the patient has been cured or not, Colonel Harrison lays great stress on the importance of the results of bacteriological examination. He points out that in several cases gonococci have been found in clear secretions, from the urethra or cervix, that to the naked eye appear to be perfectly healthy. Conversely, repeated examinations of a purulent discharge often give a negative result. No reliance can be placed on a single negative examination; a minimum of three is required before a patient can be regarded as cured. He holds that a positive complement fixation test is of value provided the patient is not being treated with vaccines.

The chapter on the treatment of syphilis has been shortened. Owing to the fact that nowadays considerably less use is made of the insoluble arseno-benzol products in the treatment of syphilis the space devoted to the subject of salvarsan and its method of solution can be reduced. In reviewing the various compounds available for use the author mentions arseno-argenticum. In his experience it has proved more effective in neuro syphilis than the other preparations. Generally speaking, the author is a strong advocate of treatment with the arseno-benzol compounds, and advises their use even after the Wassermann reaction has become negative and "continuation treatment" is in progress. In his opinion it is unsafe to assume that mercury will prevent any spirochaetes still present in the tissues from reviving. As an example of the way in which a purely mercurial treatment may keep syphilis in the simmering stage he quotes a case of syphilitic meningitis that became suddenly aggravated after nearly ten years' continuous mercurial treatment. On instituting salvarsan treatment an immediate improvement was effected and the patient's mental condition became brighter than it had been for many years. The chapter concludes with examples of the routine course for different types of cases. The tables are based on the experience obtained from a very large number of cases treated during the war and later on at St. Thomas's Hospital clinic. In the treatment of syphilis of the central nervous system the author considers that the results obtained from intravenous or intramuscular injections are as satisfactory as those observed after intraspinal medication. Chapter 22 deals with the vexed subject of prevention. In the author's opinion the greatest hope lies in the prompt treatment of patients in the early stages of the disease, thereby ensuring a maximum of cures and a minimum of infection carriers.

The chapter on the medico-legal aspect of venereal disease, contributed by Dr. F. G. Crookshank, Vice-President of the Medico Legal Society, is new, and is a very valuable addition to Colonel Harrison's work. In it are explained some of the difficulties with which practitioners may be confronted when dealing with the medico-legal aspect of venereal trouble. Such subjects as malpraxis, professional secrecy, the law of libel and slander, privilege and conduct in practice, are clearly dealt with. The paragraphs on medical testimony and the preparation of reports and the giving of evidence are extremely useful. Medical men commonly fail to discriminate between medical opinion and legal proof. In a law court questions of diagnosis, of communicability and so forth, are not regarded as positively settled unless the legal standard of strictness of proof is complied with. The standard of proof required of the medical witness is more exacting than that called for in hospital or private practice. For this reason the information given by Dr. Crookshank on the subject is of great value to any medical man liable to be involved in a case dealing with venereal disease. An outline is also given in this chapter of public health administration and law. Altogether it furnishes to the medical man information which it would be difficult for him to obtain from any other existing work. The fact that the book has reached its third edition is a sufficient indication of the good reception with which it

[2] *The Chemistry of Colloids and some Technical Applications.* By W. W. Taylor, M.A., D.Sc. Second edition. London: Edward Arnold and Co. 1921. (Cr. 8vo, p. 332; 22 figures. 10s. 6d.)

[3] *The Diagnosis and Treatment of Venereal Diseases in General Practice.* By L. W. Harrison, D.S.O., M.B., Ch.B., M.R.C.P.E. With a chapter on the Medico-Legal Aspects, etc., by F. G. Crookshank, M.D., F.R.C.P. Third edition. Oxford Medical Publications. London: H. Frowde, and Hodder and Stoughton. 1921. (Demy 8vo, pp. 545; 19 plates, 83 figures. 25s.)

has met. It is undoubtedly one of the best books available on the subject. The only criticism we have to offer concerns the arrangement of the book. We should have preferred that the two subjects of gonorrhoea and of syphilis should have been kept separate.

TUBERCULOSIS.

WE have before us five books on tuberculosis—namely, a second edition of Dr. HYSLOP THOMSON'S *Tuberculosis: Its Prevention and Home Treatment*;[4] a book with the odd title, *Practical Tuberculosis*,[5] by Dr. H. F. GAMMONS; a translation of SABOURIN'S book with the English title, *Rational Treatment of Pulmonary Tuberculosis*;[6] a book on *Tuberculosis and How to Combat It*,[7] by Dr. F. M. POTTENGER; and an original work on *Tuberculosis in India*,[8] by Dr. A. LANKESTER.

Dr. Thomson's book deals first with the causes of tuberculosis, the avoidance of susceptibility to it, and the precautions that should be taken against infection. The later part of the volume is concerned with home treatment, its object and its necessity, the measures a patient should take to preserve his health are reviewed, with a description of the various symptoms that may arise to indicate a recrudescence of activity of the disease. The book is very simply written, and as this is the second edition it has evidently appealed to the non-medical public for whom it was doubtless intended.

Dr. Pottenger's book also is for the patient, and includes most of what is to be found in Dr. Thomson's book, but it is not so simply written and is very much longer, owing chiefly to the discussion of physiological matters which have no particular bearing on the subject. It includes chapters on climate, tuberculin, and various symptoms, such as cough, expectoration, the pulse, temperature, etc. Most, if not all, of this can be quite readily explained to the patient during the course of treatment, and whether the book is really needed is doubtful.

In Dr. Gammons's book the chapters on physical signs, diagnosis, and treatment are very short, and contain, we believe, no information with which any well-informed practitioner is not perfectly conversant; those on tuberculin, the *x* rays, and artificial pneumothorax are too meagre to afford any important knowledge. If the phrase "those interested in tuberculosis" refers to the non-medical public, we are afraid a good deal of the book would be unintelligible to them, while we cannot altogether approve the use of such phrases as "blow-ups in tuberculosis" or "young men and women who are at the 'spooning' age." We do not agree that every patient suffering from tuberculosis should be submitted to the Wassermann test. The book is well printed and the proof carefully corrected, but the letter "g" is missing in Fig. 5.

Dr. Sabourin's book is excellent. The first fifty-seven pages, on the curability of phthisis, are interesting, though they perhaps hardly come within the scope of the title. Hygienic treatment receives ample consideration, and the author is a great believer in the rest treatment, if properly carried out. Fever, cough, and disorders of the different systems are thoroughly considered, and the articles on haemoptysis and colds are particularly excellent. The author's views on marriage and suckling differ in some particulars from those usually accepted. He believes that 80 per cent. of patients, if treated in time and properly, would recover. The translator, whose name is withheld, has done his work well, and the book can be thoroughly recommended.

Information with regard to tuberculosis in India up to the present is only to be found scattered in various papers, and Dr. Lankester has done well in supplying an authoritative pronouncement on the subject. He has gone into the matter thoroughly in all its aspects. He does not consider the time is ripe for compulsory notification, which would be opposed by the indigenous medical profession. Infection from bovine sources is extremely rare in large areas in India, and hence our views on the origin of surgical tuberculosis may require revision. Dr. Lankester advises the formation of what he calls a "League of Health" for educational purposes. All interested in tuberculosis in India should study the book.

IMMUNIZATION.

DR. FORD ROBERTSON'S *Therapeutic Immunization*[9] gives an excellent account of the theory, aims, and practice of an expert bacteriologist whose experience leads him to believe firmly in the treatment of disorder and disease by vaccines. The book contains chapters on such subjects as bacterial infection as a cause of disease, immunity, the theory of therapeutic immunization, bacteriological methods, and the varieties of bacteria that are of clinical importance, the preparation of vaccines and their employment. He notes that it seems clearly established that the combination of a vaccine prepared from *Bacillus coli communis* with tuberculin enhances the therapeutic value of the latter. With regard to rheumatoid arthritis, he concludes that roughly 60 per cent. of the patients are infected with a special type of pneumococcus and about 40 per cent. with an anaerobic gonococcus; the two infections are often combined, and may be associated with any of the bacteria that cause simple chronic rheumatism. Dr. Ford Robertson writes clearly and with the greatest conviction; his book should be in the hands of all who have to do with vaccine therapy.

PSYCHO-ANALYSIS.

A SERIES of volumes, with Dr. Ernest Jones as editor, is now being published under the auspices of the International Psycho-analytical Association. The first volume, *Addresses on Psycho-analysis*,[10] consists of a selection from the psycho-analytical writings of Professor JAMES J. PUTNAM, the distinguished neurologist of Harvard University, who died in 1918. Dr. Putnam became interested in Freud's work in his later years, and soon became convinced of its importance. His psychological writings were numerous, and the papers here selected are so arranged as to enable the reader to follow the development of his psycho-analytical views. The papers are not so much original contributions to the theory and practice of psycho-analysis as they are critical expositions of its essential principles. They are written persuasively and with charm, and almost every page reveals the great sincerity of the writer. As a critic Dr. Putnam is tolerant, alive to the merits of opposing points of view, understanding, and always kindly. Such an attitude gives these addresses a peculiar value, and perhaps as a contribution to psychology the merit of this volume lies chiefly in its well-balanced criticisms of divergent views. The addresses seem to reveal an increasing divergence from certain aspects of Freud's psychology, and this finds its most marked expression in the concluding paper on "the elements of strength and elements of weakness in psycho-analytic doctrine." The difference in outlook from the Freudian doctrines which is manifested in this volume is partially the outcome of a strongly humanistic tendency in Dr. Putnam's psychological attitude. He was unable to accept a rigidly deterministic view of human beings, and in this respect his views appear to approximate to those of Jung, though he was unable to sympathize with the rejection by Jung of Freud's theories of repression, infantile sexuality, and fixation. Dr. Putnam expresses the view, urged by Trotter and others, that Freud has not given sufficient attention to those influences, other than those based on sex, by which men living in social groups are practically moved—pre eminently the gregarious instinct in its different forms. These views do not appear to have gained acceptance by the psycho-analytic

[4] *Tuberculosis: Its Prevention and Home Treatment.* By H. Hyslop Thomson, M.D., D.P.H. Second edition. London: H. Frowde, and Hodder and Stoughton. 1921. (Cr. 8vo, pp. 107; 7 illustrations. 4s. net.)

[5] *Practical Tuberculosis.* A Book for the General Practitioner and those Interested in Tuberculosis. By H. F. Gammons, M.D. London: H. Kimpton. 1921. (Post 8vo, pp. 158; 11 figures. 10s. 6d. net.)

[6] *Rational Treatment of Pulmonary Tuberculosis.* By C. Sabourin, M.D. Authorized English translation from the sixth, revised and enlarged, French edition. Philadelphia: F. A. Davis Company. 1921. (Demy 8vo, pp. 446. 3.50 dollars net.)

[7] *Tuberculosis and How to Combat It.* A Book for the Patient. By F. M. Pottenger, A.M., M.D., LL.D., F.A.C.P. London: H. Kimpton. 1921. (Demy 8vo, pp. 273. 10s. 6d. net.)

[8] *Tuberculosis in India: Its Prevalence, Causation, and Prevention.* By A. Lankester, M.D.Lond. Calcutta: Butterworth and Co. (India), Ltd.: London: Butterworth and Co. 1920. (Demy 8vo, pp. 332. 10s. net.)

[9] *Therapeutic Immunization in Asylum and General Practice.* By W. F. Robertson, M.D. Edinburgh: E. and S. Livingstone. 1921. (Demy 8vo, pp. 285. 15s. net.)

[10] *Addresses on Psycho-analysis.* By J. J. Putnam, M.D., Emeritus Professor of Neurology, Harvard University. With a preface by Sigm. Freud. The International Psycho-Analytical Library, No. 1. London: G. Allen and Unwin, Ltd. 1921. (Roy. 8vo, pp. 475; 1 portrait. 12s. 6d. net.)

school, and Dr. Ernest Jones refers to this aspect of Dr. Putnam's teaching in the interesting obituary notice which concludes the volume.

It has been contended, and quite reasonably, that the widespread occurrence of neurotic symptoms under the special conditions of warfare served to contradict Freud's generalization that the psychoneuroses were necessarily conditioned by disturbances in the sexual sphere. In *Psycho-analysis and the War Neuroses*,[11] the second volume of the International Psycho-Analytical Library, an attempt is made to answer this contention by four of the leading exponents of psycho-analysis. Three of the papers were read by Drs. FERENCZI, KARL ABRAHAM, and ERNST SIMMEL at the International Psycho-Analytical Congress, 1918, and the fourth by DR. ERNEST JONES at the Royal Society of Medicine, Section of Psychiatry, in 1918. The writers express themselves with a certain reserve, and on the whole seem to take the view that the sexual factor in the production of the war neuroses has not been clearly proved, and that the matter awaits further investigation. The influence of the danger-instincts in these neuroses is not denied, but the opinion is held by all the contributors to this volume that the conflict between the instinct for self-preservation and the ego-ideal is insufficient to lead to a neurosis. It is suggested that, while genital sexuality may not operate in the production of these cases, there is a sexual fixation at the pre-genital (or so-called narcissistic) stage of development which predisposes to the occurrence of a war neurosis. Such a view involves a widening of the concept of sexuality to include self-love, and it also enables the psycho-analyst to place the war neuroses upon a sexual foundation. The writers themselves seem to feel that these views will not be readily accepted, and the attempt here made to fit the sexual theory into the war neuroses is certainly far from convincing.

SMALL GERMAN TEXTBOOKS.

WE have before us a round two dozen small or medium-sized German textbooks for students dealing with various branches of medicine, surgery, or the allied sciences. Many of them are books of some merit, and most of them have passed through several editions in the country of their production. They are all designed for the use of German students or practitioners of medicine, but some are little more than cram books. They could be employed by those British students and practitioners who have the requisite ability and desire to read German. But the volumes appear to cover very much the same ground as the many well-known British textbooks dealing with the identical subjects, and to present no single advantage, whether in matter or treatment, over the British volumes. It is therefore impossible to award specific recommendation to any of them, and for want of space they will remain nameless and receive no further notice. The BRITISH MEDICAL JOURNAL cannot refuse to receive such volumes from their German publishers, but it hardly seems worth while that they should be sent out in such promiscuous abundance for review.

NOTES ON BOOKS.

DR. DA ROCHA PEREIRA'S book on the cerebro-spinal fluid[12] gives a full account of the methods and results yielded by its examination in the pathological laboratory. He holds that meningitis without change in the cellular content of this fluid does not exist; that its examination will often give warning of imminent nervous disorder in tertiary syphilis; and that in general the examination of the cerebro-spinal fluid, systematically undertaken, is often of great value. The author gives details of the methods he employs, and tabulates his results in over 200 cases of lumbar puncture. The book is meritorious, if pedestrian; being written in Portuguese, it is unlikely to find many British readers.

The translators, under the title *Sexual Life of Primitive People*,[13] of a book by H. FEHLINGER, state in their preface that "to understand the modern sex problem rightly it is essential to know its origin and gradual development," and that they have found in the book a "short comprehensive outline of the subject, which may serve as a convenient introduction." The book is a summary, badly put together, of various sex customs in primitive races. Clothing, we are told, came into use, not, as somebody seems to have supposed, because of an inborn sexual modesty, but for protection against cold or for purposes of adornment. Among primitive races unmarried people may be allowed full liberty of sexual intercourse, but if Fehlinger intends to suggest that this is the rule he is mistaken. Occasionally difficulties arise where all the women are monopolized by the older men; but even then various methods are available for the younger men. There are chapters on courtship and marriage, and the frequency of artificial abortion in savage people is mentioned. Ceremonies connected with circumcision are described, and many reasons for its performance suggested. None of the explanations seem very satisfactory. With the remark that a Hottentot woman still had her periods at 55 the book ends. Much of the information given is interesting, but it is certainly not new; how it affects the "modern sex problem" we do not know. The nearest approach to a deduction that we can find is in the chapter on pre-marital freedom, where it is stated that "everywhere the fight against the traditional moral ideals has resulted merely in the introduction of prostitution, with all its corruption." But the author does not appear to suggest that we should return to habits of pre-marital freedom.

The massive textbook of therapeutic technique written by Professor SCHWALBE[14] and some thirty other German professors has reached its fifth edition. In the scope of twelve chapters it details treatment of many kinds, medical, surgical, and special, contrived for diseases of all the organs, systems, and parts of the human body. It contains an enormous amount of condensed and clotted information, and should be consulted by any who may desire a German handbook of treatment.

Mr. W. PARTRIDGE'S *Aids to Chemistry*[15] provides the backward student with accounts of general chemistry, inorganic chemistry and organic chemistry in less than 300 small pages. It is, of course, a cram-book, and will no doubt be of service to those in search of such.

[11] *Psycho-analysis and the War Neuroses.* By Drs. S. Ferenczi (Budapest), Karl Abraham (Berlin), Ernst Simmel (Berlin), and Ernest Jones (London). Introduction by Professor Sigm. Freud. The International Psycho-Analytical Library, No. 2. London: George Allen and Unwin, Ltd. 1921. (Roy. 8vo, pp. 59; 2 figures. 7s. 6d. net.)

[12] *Liquido cefalo-raquidiano.* Professor A. da Rocha Pereira. Porto: Compania Portugesa Editora. 1921. (Fcap. 4to, pp. 339.)

[13] *Sexual Life of Primitive People.* By H. Fehlinger. Translated by S. Herbert, M.D., M.R.C.S., L.R.C.P., and Mrs. S. Herbert. London: A. and C. Black, Ltd. 1921. (Cr. 8vo, pp. 133. 6s.)

[14] *Therapeutische Technik für die Ärztliche Praxis.* Ein Handbuch für Ärzte und Studierende. Fünfte, verbesserte und vermehrte Auflage. Leipzig: G. Thieme. 1921. (Sup. roy. 8vo, pp. 1133; 666 figures. Geh. M.23); Geb. M.260.)

[15] *Aids to Chemistry.* By W. Partridge, F.I.C. London: Baillière, Tindall, and Cox. 1921. (Fcap. 8vo, pp. 288. 6s. net.)

ROYAL MEDICAL BENEVOLENT FUND.

THE following is an abstract of some of the cases considered at the meeting of the Committee held on October 11th; £437 was voted to thirty applicants.

L.S.A., aged 78, married; is quite unable to work. His wife has been earning a livelihood as a clerk, but for the past twelve months has had very little to do owing to trade depression, and they have had to sell their belongings in order to live. The applicant's only income is 10s. a week from the Old Age Pension. Voted £5 and £26 in twelve instalments.

Daughters, aged 63 and 65 respectively, of M.R.C.S.Eng. who died in 1902. The younger sister suffers from spinal curvature and requires much attention. Owing to failure of dividends their income has been greatly reduced. Voted £18 in twelve instalments each.

Widow, aged 69, of L.R.C.P.E in., who died in 1897. Applicant was left totally unprovided for, and owing to old age and infirmity she is entirely dependent on widowed daughter, the widow of a soldier, whose only income is a pension of £1 6s. 8d. a week. Voted £26 in twelve instalments.

Widow, aged 35, of M.B.Edin. who died this year. Applicant is left totally unprovided for, with three small children. Her late husband was only insured for £100, and most of this was paid away in funeral and other expenses. Voted £20 in four instalments.

M.B.Edin., aged 71. Through paralysis has had to apply for help to pay the fees at the convalescent home connected with the hospital to which he was sent after receiving treatment. Voted £25 4s. towards convalescent home fees.

Subscriptions may be sent to the Honorary Treasurer, Sir Charters J. Symonds, K.B.E., F.R.C.S., at 11, Chandos Street, Cavendish Square, London, W.1. The Royal Medical Benevolent Fund Guild is overwhelmed, in these days of exorbitant prices for clothing and household necessaries, with applications for coats and skirts for ladies and girls holding secretarial posts, and suits for working boys. The Guild appeals for secondhand clothes and household articles for the benefit of the widows and children who in happier times would not have needed assistance. The gifts should be sent to the Secretary of the Guild, 43, Bolsover Street, W.1.

MEMORIAL TO COLONEL E. F. HARRISON.

A memorial to Edward Frank Harrison, C.M.G., Lieutenant-Colonel, R.E., who became Director of Chemical Warfare just before his death in 1918, has been placed in the Examination Hall of the Pharmaceutical Society of Great Britain. It takes the form of a portrait medallion in bronze relief, the design of Miss P. Blundell, and is set in an alabaster tablet, the inscription beneath simply records the name and distinctions of this gallant officer. The memorial was unveiled on November 2nd, within two days of the third anniversary of Harrison's death, by the Secretary of State for War (the Right Hon. Sir L. Worthington Evans, M.P.). The brief proceedings were presided over by Mr. E. T. Neathercoat, President of the Pharmaceutical Society. Among the large company present were Sir Anthony Bowlby, Sir Almeric Fitzroy, Sir W. Glyn Jones, Sir W. H. Horrocks, Sir Herbert Jackson, Major-General Sir C. E. Pereira, Sir Robert Robertson, Sir William Tilden, Sir Dawson Williams, Editor of the British Medical Journal, and Dr. Alfred Cox, Medical Secretary of the British Medical Association. Mr. Harrison did much work for the Association, including the analyses for the two volumes *Secret Remedies* and *More Secret Remedies*.

The President of the Pharmaceutical Society said that the cost of the memorial had been defrayed out of a fund raised by the Pharmaceutical Society and the British Pharmaceutical Conference. The remainder of the fund would provide for the award of an annual memorial medal in silver, and a presentation of books or apparatus, to the author of the paper, being a pharmacist of not more than five years' standing, deemed to be the best contribution of the year to the chemistry of drugs. Harrison was registered as an apprentice or student of the Pharmaceutical Society in 1884. After a very distinguished career as a student he qualified as a pharmacist in 1891, and afterwards took the Honours examination and qualified in pharmaceutical chemistry. Eventually he established himself in analytical practice. One of his most conspicuous services to the Society and to pharmacy in general was in the production of the two editions of the *British Pharmaceutical Codex* in 1907 and 1911, a work which has been recognized as a standard dispensatory for the use of medical practitioners and pharmacists. In 1915, at the age of 47, Harrison joined the Sportsmen's Battalion as a private, and after going through the usual training was transferred to the Royal Engineers; he soon became a leading spirit in the anti-gas campaign. It was mainly as a result of Harrison's zealous research and his co-ordination of the work of his subordinates that in 1916, after various other devices had been tried, the small box respirator was produced, which was afterwards manufactured to the number of twenty millions before the war came to an end. Harrison's death was due to pneumonia, to which he had no doubt been predisposed by exposure to gas in the course of his experiments.

The Secretary of State for War, before unveiling the memorial, spoke of the help the War Office had always received from pharmacists, and mentioned that he was at the moment awaiting a report from a committee, on which three of the most distinguished members of the Society were serving, on a question of great importance to the medical service and therefore to the fighting efficiency of the army. The work and devotion of Colonel Harrison had had perhaps a more direct and visible effect in safeguarding his comrades in battle than the work of any other single individual. There were many present (a reference to the guard of honour which surrounded the hall as well as to the younger men in the audience) who owed their lives to him. The problem which Colonel Harrison was called upon to solve was one of the most dramatic in warfare. He had to provide in the middle of a war an armour which would be proof against a new and sinister weapon deadly to a degree hitherto unthought of. It was a task Colonel Harrison's scientific attainments rendered him peculiarly adapted to undertake. Moreover, it was a task of chivalry, and in Colonel Harrison chivalry found its true knight. It was said in honour of the ancient kings that they killed their thousands. It would be Harrison's memorial that he saved his thousands, for not a man was sent to the front in the later years of the war who might not have to depend at some moment upon the result of his skill and knowledge. Science was a double-edged weapon, and it was impossible to be sure that future discoveries would not be put to deadly use by a desperate enemy. Science had turned the poisoned arrow of the savage into the poison gas of civilization, and it might devise weapons deadlier still. However much we might deplore their use we must be ready, if not to use them in return, at all events to meet them, and it was on this account that the soldier's need for science grew continually greater. Colonel Harrison had the knowledge and he used it, and it was a solemn pleasure to unveil a memorial to a man who was a great patriot and a great pioneer. The Minister then withdrew the Union Jack by which the medallion had been covered, and the sounding of the "Last Post" by a party of trumpeters, while the guard of honour stood at attention, closed the simple ceremony.

SUBTROPICAL ESCULENTS.

The Bradshaw Lecture.

The Bradshaw Lecture was delivered at the Royal College of Physicians of London on November 3rd, by Dr. M. C. Grabham of Madeira, on the subject of "Subtropical esculents." The following is an abstract of his remarks.

It is not within the scope of this lecture to discuss the general standards of nutrition which in their present degree of acceptance relate to essential or accessory foods, but rather to bring before the College the knowledge acquired during a long experience of the animal and vegetable esculents produced in the subtropical climate of Madeira and the other Atlantic islands. I know from the constant applications made to me at Madeira for help and advice in disseminating and transplanting from regions widely apart in our vast empire, that we are fully alive to the present need of utilizing our dormant resources.

Dealing first with vegetable esculents, I propose to select such examples as may best illustrate the growing importance of the food, vital and accessory, with which we can supplement our own home productions for the maintenance and well-being of our constantly increasing race.

The common custard apple, *Anona cherimolia*, grows abundantly in Madeira, and is exported to England in ever-increasing quantities. It has a sweet, creamy, vinous taste, rich and juicy, and is destined to rival the banana in prevalence and abundance when the public taste and demand have developed.

Nasturtium officinale, the common watercress, occurs in every mountain stream, and is largely used as an ingredient in both Spanish and Portuguese soups. Eaten in bulk it is held in high repute in the treatment of gout and rheumatism, and I have seen marked advantage derived from its use in these maladies.

Brassica oleracea, in ever-increasing variety, is an essential ingredient in Spanish and Portuguese cooking, and acquires in these latitudes a coarse, strong flavour, from which only the savoy and cauliflower varieties are conspicuously exempt.

The mango, though comparatively rare in the Canary Islands and Cape Verde, is very common in Madeira; the oval, yellow and pink flushed fruit abounds with a rich, nectarine-tasting juice, not free from a carrot-like suggestion, and finds a ready sale in London during October and November.

The orange in every variety is found in all the Atlantic islands, varying in quality, the juciest and best flavoured being those which come from a restricted area in Grand Canary Island, but their skins are too thin and delicate for commercial exportation. The orange, however, bears transport from far distant regions and is not hurt by cold storage, hence there is no lack of it in English markets.

The lemon, matchless in size and flavour, is found in all the Atlantic islands, while the Madeira citron has a world-wide fame and commercial importance.

The vine, which is commercially negligible further south in the northern Atlantic, is now assuming its proper place in Madeira; every grape of importance is to be found there and the crop is entirely devoted to the winepress.

The lupine is extensively grown in many of the Atlantic islands, both as a vineyard and field crop; the lentil is also found extensively, and forms an important adjunct to the local pottage; while the small early variety of broad bean is generally found in all the islands and at all elevations. As with the broad bean, the better sorts of pea

degenerate both in size and flavour and require fresh seed after a year or two, and even then there is lacking the full flavour of our English productions.

The soya bean was unknown in these regions until, in 1910, I introduced an important variety of *Glycine hispida* from Portugal. The high food value of the soya bean is due to its oil and remarkable protein content, present in a form incomparably superior for digestion and utilization to the cognate protein of peas and kidney beans. The soya bean is probably the only seed yet investigated which contains both the so-called water-soluble and, in a limited quantity, the fat-soluble vitamins.

The carob tree occurs in all the islands, and yields large crops of pod and bean; though neglected in times of normal supply, the carob pod became during the war a saleable article of food, eagerly eaten for its sweet farinaceous pod contents.

The peach may be said to flourish too well in Madeira, for its proper cultivation by the propagation of good sorts and the eradication of the self-sown, worthless, hard-fleshed seedlings, is sadly neglected; the same applies both to the nectarine and apricot.

The almond flourishes especially well in the island of Las Palmas, of the Canaries, where whole deep valleys are devoted to it; abundant crops of plums and greengages occur here and there in the Canaries, but not further south. In some mountain districts whole valleys are filled with flourishing cherry trees, but the cherry is not exported, as the fruit ripens when the European markets are well supplied.

Strawberries, both wild and cultivated, occur in every variety in Madeira, though not further south, and of the Pomaceae, the common pear is abundant, though the fruit is inferior, and the apple is abundant and excellent. The common quince thrives in all the islands, and is preserved by the Portuguese as an excellent marmalade.

The loquat, or Japanese medlar, has now become extremely common in Madeira, but not further south, producing its acidulous, amber-coloured fruit from February to May in heavy abundance; the loquat should be available as a cheap and most agreeable comestible in the fruit-vacant months of the early English spring.

It is due to the British people, among them many distinguished naturalists, who have settled at Madeira during the last two hundred years, that this fertile island with its scope of climate and gentle variations of temperature, has become an important focus of assembly for esculents of economic value.

Among the gorgeous varieties of passion flower which adorn the Madeira gardens the two most important are *Passiflora edulis* and *Passiflora lowei*, the latter the best of all passion fruits. The entrancing beauty of the flower alone would entitle the plant to a conspicuous place in any garden, but the fruit is in request beyond these limits and is exported in ever-increasing quantity.

Cucumbers are not common in the Canaries or Cape Verde Islands, though abounding in Madeira. Of the gourds *Cucurbita melanosperma* is a watery constituent of an agreeable Portuguese soup, and *Cucurbita moschata* is largely cultivated in all the islands; in Madeira for at least six months in the year it provides one-third of the daily nourishment of the people. The *Sechium edule chocho*, or pepinella, came to Madeira about 100 years ago, and besides the charm of its creamy flowers the plant yields now a copious and unfailing supply of an esculent of the first order in food value. I have sent this wonderful vegetable to many countries; it is boiled as a favourite vegetable in the winter months, and has an agreeable nutty flavour and a greater power of combining with fats than I have observed in any other gourds.

The Madeira coffee trees, which were formerly cultivated with great success, were entirely destroyed before we had learned how to restrain the depredations of the Argentine ant, but they are now slowly reappearing.

Artichokes give a heavy crop, and the special interest attaching to the tubers just now has reference to the presence in them of 12 or 14 per cent. of inulin, a substance akin to starch, which is convertible by appropriate treatment into fructose, the sweetest of all sugars.

The sweet potato, *Butata edulis*, is the foundation food of the Madeira peasantry, and yields freely crop after crop with no restriction of season; but there is no overplus for exportation either in Madeira or the Canaries. In the Azores the butata is grown on a large scale and yields a high percentage of alcohol, the spirit thus extracted being largely used in the treatment of wines of Portugal.

Tomato farming has now become an important commercial industry, and it is difficult to cope with the insatiability of the European markets; selection has now shown which sorts arrive in the best condition for marketing, but several forms have long been naturalized in all the Atlantic islands, and are to be found semi-wild in every district.

Potatoes are cultivated at all seasons, both at Madeira and in the Canaries, and besides forming an important portion of the food of the whole population, yield an overplus which arrives in the markets of the north as new potatoes in the early spring months.

The Cape gooseberry is found as a weed in every garden up to an elevation of 3,000 ft., but not one-tenth of the fruit is collected, though there is an unfailing demand abroad for the delicious jam yielded by these berries. The avocado or alligator pear, with its thick butyraceous substance, was the midshipman's butter of other days; it is an excellent fruit, creamy and nutty in flavour, and I have sent abundant seeds of our wild variety far and wide with a view of increasing its range by grafting.

The far-famed arrowroot of Madeira is prepared chiefly from plants of the genus Curcuma, and has a high commercial value. The yield is important, and there is no other starch comparable in specific gravity or nutrient value as this sort when well cleaned and prepared.

Of the many varieties of banana, the Atlantic islands mainly cultivate *Musa cavendishii*, both for export and home use; it is greatly superior in taste and quality to the larger and coarser fruit imported to England from the West Indies. A far superior fruit is yielded by another species, *Musa sapientium*, much cultivated in Madeira for home use, and known as the "silver banana" elsewhere.

Ananassa sativa, the pineapple, will grow wild in most of the Atlantic islands, but, sun-ripened with scientific precision and methods of retarding, its production is made to coincide with the season of greediest demand in London and elsewhere.

The common onion, *Allium cepa*, is cultivated in all the islands and exported in fabulous quantity; the size and quality obtained in Madeira can hardly be surpassed. Long before the physiologists began to speak about vitamins the general public had shown an instinctive taste for the onion, which, though poor in caloric value, abounds in accessory food virtue.

Indian corn, wheat, barley, rye, and oats are grown in all the Atlantic islands in excellent quality, but in Madeira the yield is not more than enough to feed the population for about two months. The sugar cane is a general object of cultivation in all the islands, and the juice is partly devoted to the distillation of alcohol, but mainly for the manufacture of an excellent sugar.

All the well-known fungi of the British Isles are well represented in the islands of the Atlantic; one form, *Boletus edulis*, abundant in the pine woods of Maderia in the autumn months, is a substantial esculent with a tangible protein value.

The animal foods of the Atlantic islands I can pass over with the general remark that cattle of every well-known breed abound, and that we have at all seasons poultry, eggs, milk, and butter in abundance, both for local use and for exportation. We rely, too, on our goats' milk, which is excellent and happily free from the infection which our distinguished Fellow, Sir David Bruce, was able to investigate at Malta.

I shall now touch upon the salient points relating to the latent, almost unexplored resources of food which the surface water and abyssmal depths of the seas in these regions invite us to explore.

From the economic point of view the *Thynnus*, or tunny, is our most important fish; it is never long absent from our island markets, but visits Madeira in vast numbers in the early spring months. In Atlantic regions it is captured with a stout hook baited with a living mackerel or herring, and a full-grown example, quite ten feet long, weighs generally about 400 lb.; when eviscerated and prepared for market, quite 85 per cent. of the fish meat is available for human food.

The *Lepidopus* is a truly subtropical fish of wide distribution, known occasionally under the name of the "scabbard fish," even as far north as our own southern coasts, while in New Zealand it is called the "frost fish," and esteemed the most delicious of that dominion. With the tunny it is the mainstay of our market supplies, and grows to a length of about six feet.

The shern or sherny, *Polyprion cernium*, may be taken as typical of the highly important food-yielding order of the Percidae. It is found throughout the Atlantic Ocean, and even also in the Mediterranean; in Madeira it is one of the best known fishes in the market, esteemed for its white flesh and substantial nutriment. The proper home of the well-grown adult is in the deep open abyss, and it

is taken by the hook at the enormous depth of 2,500 ft. or even deeper; coming up from a depth so stupendous, the fish becomes so distended with gas, expanding upon the removal of the vast pressure below, that it arrives at the surface in a sort of cataleptic spasm, the stomach usually everted, and the eyes forced from their sockets.

The prawn exists in the deep in great numbers, and, like some of the deep sea larger fish, does not survive its transference to the surface; some of them escape from the traps in the process of hauling in, but float to the surface dazed and helpless with the destructive expansion already noticed.

A delicate red mullet is taken abundantly at all seasons in shallow waters in traps made of cane or wicker-work, without any bait.

Distinguished ichthyologists have gazed in wonder at the unwonted variety, overflowing abundance and colouring of our southern fish markets. There are no flat fish, and the common members of the codfish tribe, which so largely fill our stalls in England, are usually represented by only one subordinate species, the Mediterranean phycis, while the dull-tinted tunny contrasts with the brilliant lines of the serranus and lampris, the beryx attracting interest both by the delicacy of its hues and the brassy lustre of its enormous eyes.

We have in these southern waters a reserve of wealth of food which, with the progress of investigation, will eventually be made to minister to the needs of many a populous region far beyond the limits of its present application. When we remember the great depth of the oceans and that animals are found at every depth, we may truly conclude that the total quantity of living matter in the sea greatly exceeds that on the land surface of the earth. The whole subject of these super-equatorial marine food resources abounds both with economic and biological interest.

ALGIERS.

[From a Correspondent.]

"*I speak of Africa and Golden Joys.*"

The season is now approaching when the favoured few who have survived the operations of the tax and rate collector begin to preen their wings in anticipation of the flight south "where the feathery palm trees rise, and the date grows ripe under sunny skies."

As October merges into November, as the atmosphere becomes murky and the skies inclement, what more delightful feeling than the knowledge that in a couple of days we shall be passing through the south of France, under cloudless skies, on our way to a climatic paradise? Those whose time hangs heavy on their hands will be well advised to dawdle through this stage of the journey, quitting the main P.L.M. line at Tarascon in order to visit Montpellier, with its venerable university, the one where Rabelais professed; Aiguemortes, twenty miles away, with its admirably preserved Louis XI fortress, in which the last Protestants to be imprisoned in France were segregated (one of them, a woman, chipping on the wall the highly characteristic suffragette injunction "*Resistez toujours*"); Nimes, with its magnificent gardens *à la* Versailles, its hoary arena where bull fights are still occasionally to be witnessed, and its numerous Roman and mediaeval remains; Arles, with its mutilated but still imposing arena, multitudinous ruins, and interesting museums; and, finally, the magnificent mediaeval fortress-town Carcassone. The tourist is not obliged to retrace his steps to Marseilles, for once a week there is a swift (twenty hour) crossing from Port Vendre to Algiers by *La Marsa* of the Navigation Mixte Co.

In the ordinary way the traveller goes right through to Marseilles and thence by the Transatlantic Company's fine mail steamers direct to Algiers or Tunis. As a rule fine early autumn weather, with an average day temperature of 70° can be reckoned on right up to Christmas. As a matter of fact, there is no real autumn in Algiers. During the summer the country is parched by the continuous but not necessarily excessive heat and the four or five months without rain, but so soon as the autumn rains fall, usually in September, the bosom of Nature begins thenceforth to heave, soon the soil is covered with a tender green, and "Spring unlocks the flowers to paint the laughing soil."

Until then the country, rich though it be in excursions, offers no attraction to the traveller, but by mid-October Nature will have trimmed the landscape, washed the roads, and made things shipshape. The characteristic feature of the climate of Algiers—which, of course, differs materially from that of the highlands of Kabylia and that of the Sahara—is its mildness and brightness. A good general idea of the winter climate of Algiers and of the resources of Algeria from the tourist's point of view may be gleaned from a little book, *From Cloud to Sunshine*,[1] while the itineraries of the various promenades and excursions are set forth in *Promenades à Alger: Excursions en Algérie* (same publisher), an English edition of which is, it is announced, in the press.

The town of Algiers enjoys the reputation of providing an agreeable residence during the winter months and those who dread the inclemency of the northern winter will assuredly find it a pleasant alternative. It is delightfully and picturesquely situated and is big enough (close upon 200,000 inhabitants) to afford a variety of entertainments. Then, too, it is rich in pleasant walks and excursions along shady lanes, through forests, over mountains, and on the shore of the charming bay of Algiers.

With regard to the climate visitors must not run away with the idea that they are going into the tropics. From November to March is the rainy season, and during that period a good deal of rain falls. When it does rain, however, it rains heavily and jovially, and two-thirds of the fall is after sunset, so that the total number of rainy days is not excessive, and few indeed are the days not enlivened by several hours of bright, if at times precarious, sunshine.

With regard to clothing it is well to be provided with such garments as would be considered suitable for early spring in England, including a light overcoat and fairly warm underclothing.

The eligible part of Algiers, the part frequented by *hiverneurs* is Mustapha Superieur which is a couple of miles from the centre of the town, and is reached by a smart electric tram along winding roads commanding views over sea and land of unparalleled beauty. The fashionable hotels are situated in this suburb, which has many majestic Moorish villas half buried in orange groves, most of them occupied by English and American residents.

Owing to its situation close to the sea Algiers is not suitable for consumptives, but it is well adapted for the delicate who require plenty of fresh air and sunshine, for persons suffering from cardio-vascular and chronic renal lesions or rheumatism. Cases of neuritis do better inland in the dry desert air, say at Biskra, and this remark applies to many cases of essential asthma, bronchial asthma, and emphysema. Of motor excursions the foremost is assuredly the tour through Kabylia, the extensive group of mountains between Algiers and Constantine culminating at the Tirourda Pass, 6,000 feet high.[2] The scenery on the way is of the grandest and wildest description, a distinctive feature being the native villages perched on the summits of the craggy hills and therefore easily defended. These can be visited, and offer much of interest for the traveller's inspection: manufacture of native jewellery, inlaid swords, daggers, etc. From Tirourda one can proceed to Bougie, a charmingly situated seaport from which one reaches the famous Gorges du Chabet-el-Akhra; also the intensely picturesque corniche road to Djidjelli.

On the farther edge of this mountain plateau is Constantine, with its awe-inspiring Gorges du Rhummel, the extensive Roman ruins of Timgad, reached via Batna, and, as we descend into the desert, El Kantara and Biskra, which is itself a great centre for excursions into the desert, to Tolga, Tooggourt, and Ouargla. Then, too, within a few hours by motor from Algiers, the traveller can get to Bou Saada, the home, or one of the homes, of the dancing sisterhood of the Ouled Naïls. To the west lies Tlemcen, with its forty mosques and wonderful Saracen ruins at Mansourah. Still another few kilometres and we are at Oudjda, the first fortified town in Morocco. To the north is Oran, a thriving but not very interesting seaport, and to the south is mysterious Figuig and the great red desert.

Not so far afield, some forty miles to the west of Algiers, is the extraordinarily interesting seaside place Tipaza, the site of a one-time fashionable Roman health resort, and rich in partially disinterred ruins. Another twenty miles and there is Cherchel, the former capital of Mauritania, with its ruined but still magnificent aqueducts and palaces.

[1] Baillière, Tindall, and Cox, 3s. 6d.
[2] See Grant Allen's novel, *The Tents of Shem*.

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TUBERCULOSIS IN POLAND.

We have received from the Public Information Department of the American Red Cross an interesting note upon tuberculosis in Poland by Dr. Charles Phillips, statistician to the American Commission. Down to the outbreak of war tuberculosis was declining in Poland as in western Europe, but with less regularity. Shortly after the outbreak of war the rate took an upward turn, and by 1917 the ravages of the disease were immense; it is said that 4 per cent. of the inhabitants of Warsaw died in 1917, and that one-fourth of these deaths was ascribed to tuberculosis. The increase in tuberculosis amongst children was proportionally greater than amongst adults; every third child examined in hospitals or private homes was considered to have the disease.

At the armistice the curve of tuberculosis began to descend, and by 1920 had reached approximately the same point as in 1914. Important antituberculosis measures were introduced by the Polish Government, and the energetic action of the Hoover food relief commission and the American Red Cross was of great value. The effect of these measures was most noticeable amongst children, who, in 1919–20, suffered less from tuberculosis than before the war. At adult ages, on the other hand, the position was not better than in 1914. A probable explanation is that the measures of relief were planned with especial reference to children.

An interesting point brought out is the relative immunity of Jews from fatal tuberculosis. According to Dr. Ganc, a Warsaw physician, the mortality rates of Jews and non-Jews are on the average in the ratio of 100 to 180, and this applies not merely to the rich and well-nourished Jews but to all classes. In a memorandum read to the Social Medicine Association of Warsaw on October 13th, 1921, Dr. Ganc stated that this relation had been observed in other countries, that "the non-Jewish population of England, supposedly the healthiest of all nationalities, is still more subject to tuberculosis than the poorest Jews of the London Ghetto. In New York the average city adult death rate is 12.93 per 1,000, but the Ghetto rate is below 10.00; the city's infant mortality rate is 85 per 1,000, while the Ghetto rate is only 52, although this figure applies to a district so congested that the population averages 3,000 people to a city block."

We do not know upon what official statistics Dr. Ganc bases his statement respecting the London "Ghetto," nor, indeed, how the mortality rates upon Jews and non-Jews can be computed from official data. We are also afraid that Dr. Ganc's tribute to the healthiness of the English population can only be accepted with reservations. In later childhood the mortality rate in England and Wales is, we believe, one of the lowest in the world, but, as we recently observed, at ages over 35 our status is not gratifying and contrasts very unfavourably indeed with that of Sweden.

Dr. Ganc attributes the alleged immunity of Jewish populations to their age-long association with urban life. In other words, it is, in his view, a consequence of selection; "probably," he says, "many centuries ago, in the days when the Ghetto originated and the Jews were forced into the towns, they paid a heavy tribute to the white plague." Dr. Chmielowski, of the Polish Ministry of Health, is a supporter of Dr. Ganc's theory, and adduces certain Viennese statistics in its favour. According to these, Protestants come next to Jews in the rate of mortality from tuberculosis, while Catholics have the highest rate. The Protestant population of Vienna is said to have consisted largely of official classes who had lived for generations in the capital, while the Catholics were largely recruited from the country districts. Until we have had an opportunity of analysing the data upon which these conclusions rest, we shall suspend judgement as to their cogency.

The etiology of tuberculosis is a fruitful field for the growth of hypotheses, and the soil raises a goodly crop of weeds, often hard to distinguish from useful plants. Writers seldom realize how wide is the interval between a fireside speculation and a scientific hypothesis. To test the influence of selection upon human mortality is very difficult. In an absolutely unprogressive community much could be learnt from a comparison of successive life-tables. If, for instance, the life-table death rate at age 20 in one decennium is less than it was at the same age in the previous decennium, the decline might be a direct consequence of the selective action of the mortality experienced by persons aged 10 in the previous decennium, *if* the environment had remained constant and there had been no migration. But the proviso is usually unwarrantable, and to make due allowance for the changes which really occur has so far been impossible. Similar difficulties confront such hypotheses as those associated with the name of Professor Calmette. The noble savage has other blessings of civilization to endure as well as the bacillus of tuberculosis. Many years of co-operative study and research will be needed before the etiological problems of tuberculosis are solved.

PATHOGENESIS OF DISSEMINATED SCLEROSIS.

Dr. Birley and Professor Dudgeon's[1] clinical and experimental contribution to the pathogenesis of disseminated sclerosis is singularly complete and interesting, for in addition to its record of careful bedside and laboratory investigation it reviews the recent work on this difficult subject and criticizes the view that the disease is due to spirochaetal infection, not only in the light of their own negative results but also on other grounds. For example, Dr. D. K. Adams's contention, based on a colloidal gold luetic or paretic reaction of the cerebro-spinal fluid in 95 per cent. of his cases, is met by the objection that until the rationale of this reaction is more fully understood, arguments depending on its presence and behaviour are unsubstantial. Their own results, obtained from bacteriological examination of 35 cases, in 15 of which animal inoculations were carried out, in two instances from *post-mortem* material, did not throw any light on the pathogeny, for no specific micro-organism was isolated, and attempts to transmit the disease by inoculation of cerebro-spinal fluid and other material from man to rabbits failed. That the disease has—as W. E. Bullock (now W. E. Gye), Siemerling and Raecke, Kuhn and Steiner, Simons, Marinesco, and others claim—been thus transmitted, is regarded as unproved; for even if it be admitted that a disease is conveyed, there is a complete absence of histological proof that the disease thus

[1] J. L. Birley and L. S. Dudgeon: *Brain*, London, 1921, xliv, 150–212.

transmitted is disseminated sclerosis. Rather appropriately, the next paper in this number of *Brain* is on an experimental study of disseminated sclerosis by Dr. W. E. Gye,[2] based on the injection of 129 rabbits and 15 guinea-pigs with cerebro-spinal fluid from 21 patients with disseminated sclerosis; 17 of the rabbits but none of the guinea-pigs became paralysed. This infrequency of positive results, which has been the experience also of other workers, is explained on the assumption that the organism, if there be one, is not constantly present in the cerebro-spinal fluid, and never in large numbers. Dr. Gye admits that the necessary control experiments, namely, the inoculation of a large number—such as 100—of rabbits with the cerebro-spinal fluid of persons certainly not suffering from disseminated sclerosis, have not yet been carried out, but he concludes that disseminated sclerosis is probably an infective disease, and that the virus may sometimes be found in the cerebro-spinal fluid.

Dr. Birley and Professor Dudgeon dismiss the endogenous explanation of the disease, namely, that it is due to some developmental or congenital defect of the neuroglia, which is thus more liable than normal tissue to be affected by irritation—in other words, that the disease is a primary gliosis—as incompatible with its sudden exacerbations and long remissions. On the other hand, the exogenous hypothesis is quite compatible with the discontinuous clinical course of a disease due to the presence of a morbid agent acting with varying degrees of intensity over a considerable period of time. The clinical and histological evidence is regarded as overwhelmingly in favour of the view that the morbid process underlying the disease is inflammatory in nature. The absence of cytological and chemical changes in the cerebro-spinal fluid does not seriously militate against this conclusion, for, in the first place, such changes depend on meningeal lesions rather than on reactions of the nervous parenchyma, and, in the second place, alterations in the cerebro-spinal fluid may be conspicuously absent in such frankly inflammatory conditions as acute poliomyelitis and encephalitis lethargica.

The clinical analysis of the 35 cases, for which presumably Dr. Birley is responsible, brings out some interesting points. Accurate diagnosis is particularly essential in cases used for experimental investigation, otherwise fallacies may arise from utilizing cases really of cerebro-spinal syphilis, for these two conditions differ from others in presenting evidence of very widely separated lesions of the central nervous system. The disease is one of healthy young adults, and in the large majority of cases is characterized by an intermittent course with a haphazard series of relatively acute disturbances due to focal lesions distributed at random, both in the brain and spinal cord, appearing at irregular intervals, and in their early stages showing a general tendency to improvement, so that the possibility of spontaneous cure cannot be entirely denied. In a small proportion of the cases—5 out of the authors' 35 cases—the disease runs a chronic progressive course from the outset; but these two clinical forms are manifestations of the same disease. They are not the results of distinct pathological processes, as was argued by Müller, who sought to confuse the subject by making the unwarranted suggestion that the chronic progressive form, originally described by Charcot, was the only true disseminated sclerosis, and was due to external factors acting on a congenitally vulnerable neuroglia, whereas the commoner discontinuous form was a different disease, for which he proposed the somewhat similar name, disseminated encephalo-myelitis.

[2] W. E. Gye, *Brain*, 1921, xliv, 213-222.

POPPIES FOR REMEMBRANCE.

The celebration of Armistice Day, November 11th, is primarily in remembrance of those who gave their lives in the war. The list compiled at the time of the Special Clinical and Scientific Meeting of the British Medical Association held in London in April, 1919, contained the names of 1,196 medical men; of these, 681 were killed in action, or died from wounds, or were drowned by enemy action; the remainder (515) died of disease while on service. In addition to the commemoration of the dead and the celebration of victory, Armistice Day was this year the occasion of a special effort on behalf of Field-Marshal Earl Haig's appeal for ex-service men of all ranks, made through the British Legion, which invited all to purchase and wear poppies (Flanders poppies). The reference is to John McCrae's poem.[1] McCrae, who was born in 1872, was lecturer in pathology and afterwards in clinical medicine at McGill University; he was the joint author with Professor Adami of a well known textbook of pathology. He saw active service as a combatant officer during the Boer war, and went overseas with the first Canadian contingent in October, 1914, as medical officer to the first brigade Canadian Field Artillery. When the McGill University Hospital unit was formed he became lieutenant-colonel in charge of the medical division, and at the time of his death had just been appointed consulting physician to the Imperial troops in France. During the second battle of Ypres he was in charge of a dressing station in a hole dug in the bank of the Ypres canal; it was in this dug-out, a square hole 8 ft. by 8 ft., roofed over by fragments to keep out the rain, and having a little sandbag parapet to keep out pieces of kick-back shells, that he wrote the appealing piece of verse that was to stir so many hearts. It opens with the lines:

> "In Flanders fields the poppies blow
> Between the crosses, row on row,
> That mark our place."

The lines quoted by the British Legion in support of Earl Haig's appeal are those with which the poem ends:

> "If ye break faith with us who die
> We shall not sleep, though poppies grow
> In Flanders fields."

Sir Andrew Macphail, in a short biography he appended to a collection of John McCrae's poems, wrote: "John McCrae witnessed only once the raw earth of Flanders hide its shame in the warm scarlet glory of the poppy. Others have watched this resurrection of the flowers in four successive seasons, a fresh miracle every time it occurs."

ARTIFICIAL LIMBS.

The third official Committee of Inquiry on Artificial Limbs, which was appointed by the Minister of Pensions on July 5th, 1921, has made its report with commendable promptitude. A Departmental Committee, under the chairmanship of Mr. Herbert Guedalla, M.P., reported in May, 1919, and an Expert Committee under Admiral Bacon in August of the same year. The third Committee was probably called into being in response to the outcry in the lay press and elsewhere of those disabled officers and men who considered that the Ministry of Pensions had not supplied them with the best obtainable artificial legs. It differed from previous committees in that three out of seven of its members had lost legs, and therefore were presumably able to tell "where the shoe pinches." An important instruction in the terms of reference was "to inquire into the comparative advantages of the metal and the wooden limb." The chief subject of discussion appears in effect to have been the question of whether a metal limb should be supplied as a matter of course for thigh amputations, such a limb, on account of its very high cost, having previously been refused by the Ministry, except for very

[1] It was first published in *Punch*; see also *In Flanders Fields and other Poems* (London: Hodder and Stoughton. 6s. net).

special cases. Practically there was only one manufacturer in the field, and the metal socket required special skill and the expenditure of much time in fitting it to the stump, so that the output of this limb was small compared with the number of men—about 17,000—who have undergone amputation of the thigh. Fortunately, before the Committee sat a compromise had been made possible by which an ordinary wooden socket made by any limb-maker could be fitted to the remainder of the metal limb, and this and other considerations reduced the price asked to something less than half of that which had been paid previously. Moreover, there is, it is stated, every hope that shortly the price may be reduced to the level of that of a wooden limb, or even less. The Committee was therefore able to recommend that the four categories of cases should be broadly dealt with on the following lines: "(1) The 'Desoutter' and/or other approved light metal limbs should be placed upon the consolidated list, and should be made available for all new cases in which the surgeon recommends them on surgical or other grounds, instead of the standard pattern wooden leg. (2) We think that the lighter wooden or metal limb should, subject to the approval of the surgeon, be made available as soon as possible in all such cases. (3) We recommend that a change from one type of limb to another in these cases should only be made when one of the wooden limbs which the man at present possesses is worn out, and then only if the surgeon concurs. (4) In these cases we think the man should be allowed to continue the use of the heavy or out-of-date leg if he prefers it, and to a resupply when it is worn out if reasonably possible to obtain it, so long as, in the opinion of the surgeon, he is suffering no great harm therefrom." The evidence shows that there would be no need to supply two new limbs in cases (2), (3), and (4), but that the second or spare wooden limb with which the man is already supplied would suffice for temporary use while his other limb was undergoing repairs or replacement. As it is hoped that the metal limbs will last longer and cost less to repair than the wooden ones, it is calculated that a saving to the public purse will result. These recommendations, which no doubt have been accepted by the Minister, should put an end to what has seemed a difficult situation. We notice that a person who has three sound limbs is called "limbless." Once more we protest against this absurdity.

"SUMMER TIME" AND HEALTH.

In 1916 the late Sir Frederick Taylor, who made inquiries on the effect of the Summer Time Act on health, at the request of the Home Secretary, stated that in the opinion of other representative physicians and himself the additional hour of sunlight or daylight tended to improve health, from the well known physiological effect of light upon the biological processes in both animals and plants. Towards the end of last summer, however, a certain amount of public criticism arose in regard to the subject, no doubt in part owing to the extraordinarily long spell of hot and dry weather. In consequence local education authorities were asked by the Board of Education to ascertain what the effect had been of the Summer Time Act during the current year on the health of school children. In some cases the opinions of teachers differed very widely in the same district. Dr. Wyche, for instance, at Nottingham, received a report from one teacher that not a single child had suffered, while another had no hesitation in saying that for the majority of the children the Act was most disastrous in its effect. After a detailed statistical investigation, however, Dr. Wyche came to the conclusion that there was a lack of any trustworthy evidence to show that the working of the Act was detrimental to the health of the children. It was necessary to distinguish between results inherent in our Summer Time Act, and incidental results due to lack of adjustment to its operation. Schooltime is not prolonged by the Act; it is merely moved as a whole one hour earlier, and a longer period of daylight is made available. The London County Council, at the request of the Board of Education, took expert opinion from within its service, and has reported that in the opinion of its advisers the Summer Time Act is an advantage to school children and young persons. On November 2nd, in reply to a question in the House of Commons, Mr. J. Parker said that the Board of Education had received 272 replies from local education authorities with reference to the maintenance of the Act; of these, 158 were in favour of its continuance, 29 expressed no definite opinion, and, while 85 attributed some ill effects to the operation of the measure, the great majority of these bodies believed that these ill effects would be obviated if parents would send children to bed at a reasonable hour. An interesting section of the annual report[1] for 1920 of the chief medical officer of the Board of Education deals with this subject, summarizing the reports of a number of school medical officers. The consensus of opinion seems to be that there is no substantial support of the contention that the Act can be held responsible for any reduction in the hours of sleep of children. There are indications, as there always have been, that children are getting less sleep in the summer months than during the rest of the year, but this is believed to be rather a matter of custom and habit and of parental responsibility and supervision than due directly to the operation of the Summer Time Act. The general impression left by the report is that a certain number of parents have failed to adjust the bedtime arrangements for their children to the operation of the Act; what is wrong, therefore, is not the Act, but the failure of a fraction of the people to adapt their habits to its terms.

EXPERIENCES OF SEASIDE PRACTICE.

In his address from the chair of the Section of Balneology and Climatology of the Royal Society of Medicine on November 3rd, Dr. Hill Joseph of Bexhill reviewed a quarter of a century of seaside practice, and discussed the value of sea bathing. Medical men, he said, were not often consulted about the suitability of sea bathing in the individual case, because as a rule only the robust indulged in this exercise, and those for whom it was unsuitable quickly discovered the fact for themselves. The prevalent custom of going to bathe in bathing costume and mackintosh and returning home in wet garments was a physiological mistake; the bather missed the beneficial effects of skin massage with the towel immediately on leaving the water and the exhilaration of the walk in dry clothing. The people who should not bathe in the sea could not be put in a single category. Many who could safely bathe in enclosed swimming baths, even of cold water, could not safely bathe in the open sea. Generally speaking, sea bathing should not be allowed in the case of people who had any organic disease which gave definite symptoms; it was particularly inadvisable for those who suffered from arteriosclerosis and high blood pressures or from any organic or degenerative affection of heart or lungs, with the exception of some cases of compensated mitral regurgitation. Others who should not bathe were sufferers from subacute or chronic abdominal disease, especially chronic colitis, gall bladder affections, renal disease, and cystitis. All skin affections, except some of a very chronic character, were aggravated by sea bathing, and sometimes a dermatitis resulted. Some persons complained of an excess of wax in the ears after swimming, but probably the superabundance of cerumen was there already, and the salt water caused it to swell up into a soft mass which exuded. Bathers prone to ear trouble could prevent any aggravation from sea-water by inserting in the ear a piece of cotton-wool

[1] Annual Report of the Chief Medical Officer of the Board of Education, 1920. London: His Majesty's Stationery Office. 1921. (Price 6s. net.)

moistened with almond oil, but they should be properly instructed in this small matter. Paddling was sometimes followed by abdominal upset; many children at the seaside, with appetites stimulated by outdoor life, unduly taxed their digestions, so that, having an overloaded colon to start with, the hot sun on the head, together with the wet feet, caused congestion in the abdominal area. The seaside was desirable as a place of residence for children, but those who went to boarding-school there should have their holidays inland. Of recent years it had become the fashion to send cases of surgical tuberculosis to the seaside. Dr. Joseph believed this to be a justifiable practice, and that early phthisis benefited also, especially when combined with the judicious use of tuberculin; but more advanced cases of phthisis, while they obtained benefit from the change to the sea in summer, should not in general be advised to live permanently at the seaside. He protested against advanced cases of phthisis being sent to the seaside without information being given to a local medical man, and the same protest applied to all cases of serious illness. In return, seaside practitioners should write to the ordinary medical attendant of a visitor, giving particulars of any illness of a serious kind from which he had suffered during his stay. The speaker was not satisfied that the classes of cases grouped together under the name rheumatoid arthritis were unsuitable for residence at the seaside, although this was often stated. Certainly they were not made worse; some improved, and a few lost their symptoms if they underwent treatment long enough. On the other hand, he did not agree that these cases never originated at the seaside. A large proportion of seaside residents were middle-aged retired people, who lived too well and took too little exercise, and to the consequences of their defective digestions must be attributed the bad name which the seaside undeservedly had gained so far as this group of diseases was concerned. Sufferers from Graves's disease should not live too near to the sea front; they would be more comfortable half a mile or so inland, and should spend the hotter months away from the sea altogether. The seaside was of special value to convalescents from acute disease or operation, sufferers from neurasthenia, from insomnia (in most cases), from hysteria, from chronic bronchitis (late spring to the end of October), cardiac disease (if not too advanced), asthma (some cases), and convalescents from tropical diseases. Dr. Joseph appealed finally to members of the section to undertake a collective investigation to ascertain what diseases were specially benefited by residence at the various balneological stations and seaside resorts of this country. Dr. C. W. Buckley, in proposing a vote of thanks, said that his study of the subject had brought him to the conclusion that climate had practically no influence upon the progress of rheumatoid arthritis.

GAMES FOR GIRLS.

The subject of games for girls led to an interesting discussion at the meeting of the Medical Officers of Schools Association on October 21st. The openers, Dr. Alice Sanderson Clow, medical inspector of the Ladies' College, Cheltenham, and Miss M. Stansfeld, principal of the Bedford Physical Training College, and every participant in the discussion, with one exception, were in favour of vigorous outdoor games for girls—subject to certain precautions, especially at the menstrual period—and the hope was expressed that the discussion would do something to neutralize the contrary impression fostered recently by press correspondence. Dr. Clow regarded the value of games and physical exercises in the open air for girls as beyond all doubt; the only question was whether strenuous games had any damaging effect upon the organs of reproduction. She had taken special note of the effect of games on the menstrual function in schoolgirls, and had kept a record of over 1,500 cases. Taking, on the one hand, girls who played games, and, on the other hand, girls who did not, she found that the proportion of those who suffered from menstrual disorder was smaller in the first category than in the second, and the proportion in the first category was further reduced amongst those whose exercises were continued without interruption during the menstrual period. For the last eight years she had been advising every girl to continue her warm bath and her games during the menstrual period if she felt inclined to do so. A great many girls who formerly suffered from various degrees of dysmenorrhoea suffered from it no longer after participating in games during this period, and she regarded the prevalent idea that girls should forego all exercise during the catamenia as not in accordance with nature. The best games for schoolgirls were team games—for example, cricket, hockey, and lacrosse. One important matter was to ensure that girls of about the same age and strength were matched against each other. If girls played against men, or if there was any great disparity between the strength of rival teams, it would mean undue and possibly harmful exertion on the part of the weaker. The question had sometimes been raised as to whether games should be allowed immediately after meals. Her own observation of children and her recollection of her own childhood suggested that digestion proceeded just as easily, and perhaps with rather less mental irritation, if no restraint was placed upon the desire of a child to run about directly after a meal. Miss Stansfeld, who also dealt with the effect of games upon the menstrual function, remarked that out of a hundred girls at Bedford it was found that in the case of 97 their movements in the gymnasium were adversely affected during the catamenia. They could not do balance walking nearly so well as at other times, nor could they carry out any gymnastic exercise needing a good deal of co-ordination. In games they found that their "eye was out" during this period. This pointed to some amount of nerve strain, and accordingly she allowed no girls to play games or take vigorous gymnastic exercise during the first three days of the menstrual period. Miss Stansfeld had got into communication with thirty-five former students who had married and borne children. She had asked them to give her particulars of their health during pregnancy, any difficulty in labour, the completeness of their recovery after childbirth, and the general health of the infant. The replies appeared to show that the history of pregnancy and parturition among those women who at college had undertaken extremely vigorous exercise was in no way different from the general experience. As for nursing their infants, just over half of them had been able to suckle the baby for eight or nine months, others for a shorter period. Some question was raised as to whether these ladies, from the very fact that they had been students at the Bedford Physical Training College, were not physically a selected class to begin with, so that nothing could be deduced from them with regard to the general girl population; but Miss Stansfeld said that the only physical test on entering the college concerned the heart and lungs. Dr. Letitia Fairfield said that her experience, as woman director in the medical service of the Royal Air Force, proved to her that there were some games or exercises which should be ruled out so far as women were concerned. One of these was football, which had a vogue among the Air Force women, and was now becoming popular among factory girls in the North of England. It was a game quite unsuitable for women. It meant occasionally direct violence, especially on the chest, and this was not true of any of the other games, like tennis or hockey, if properly played; it imposed also a very considerable strain upon the pelvic region. Another exercise with regard to which an adverse verdict must be given was motor cycling. The vibration of the motor cycle, and especially the effort at starting, accentuated dysmenorrhoea if a girl was already liable to it. At the

same time Dr. Fairfield strongly believed in games for women, and her experience in the Air Force was that menstrual disabilities largely occurred among the clerks and sedentary workers. As a rule, the girls who suffered from menstrual troubles were those who had never gone in for games which developed their muscles. She agreed with Dr. Clow that games were not necessarily to be prohibited immediately after meals. Games played when fasting were possibly more exhausting and dangerous than games on a full stomach. Dr. Elwin Nash drew attention to the dangers of cycling for small children, particularly the want of care often shown in fitting the cycle to the size of the child, with the result that the child had to make extraordinary contortions in order to ride the cycle at all. He regarded swimming as the most strenuous of all forms of exercise; swimming races produced more heart strain than any other form of sport. Another thing needing careful supervision was mixed hockey, because the added effort which the girls had to put forth in order to compete with men might be harmful to them. Dr. Mary Scharlieb and others, both doctors and educationists, expressed themselves in favour of strenuous exercise and games for girls, both on account of their hygienic and their moral value, the latter by way of discipline and team-work.

LEPROSY IN THE PHILIPPINES AND HAWAII.

Leprosy, as is well known, is still found sporadically in the United States. The last report of the Surgeon-General of the Public Health Service shows that during 1919 54 new cases of leprosy were reported in continental United States, and at the end of that year there were in all on the mainland 206 cases, of which 89 were segregated in the Louisiana State Leper Home at Carville. In contrast with the mainland, there were a large number of cases of leprosy in the Island possessions, by far the greatest number being in the Philippines, where more than 5,100 cases were under treatment at the close of 1919. In Hawaii there were 685, and in Porto Rico 37. Some account of leprosy in the Philippine Islands is to be found scattered through the pages of the Director's report of the Philippine Health Service in 1919, of which a copy reached us a short time ago. The practice of the Service is to arrange leper collection trips each year by boats and trains. The patients collected by train are sent to the San Lazaro Hospital in Manila, where they are submitted to clinical and microscopical tests. Those found positive are taken thence and confined for treatment in the Culion Leper Colony, which has a population of upwards of 4,700. Most of the patients reach there in a weakened condition and in advanced stages of the disease; moreover, leprosy is often complicated with other diseases. The Director believes that the procedure of taking all the lepers in the provinces and confining them in the colony will eventually result in the eradication of leprosy in the Philippine Islands. There are, however, difficulties in the way of "a real clean-out campaign," for many lepers try to evade arrest, and escapes from the detention houses are not infrequent. Thus, in 1919, 34 escaped and 12 only were recaptured; in 1918 there were 37 escapes with 14 recaptures. So great, indeed, is the force of sentiment, that the district health officer of Bulacan thinks it next to impossible to eradicate leprosy with the present system and means at command. On the other hand, some encouragement is to be gleaned from the Director's statement that the lepers at Culion are not lacking in interest in life; many of them take an active part in business pursuits, theatricals, club life, cultivation of the soil, and local politics. The efforts of the Health Service to create among these unfortunate people a feeling of relative contentment with their lot have, he says, met with ready response. The report from the Leprosy Investigation Station in the Hawaiian Islands is distinctly more hopeful. Never in the history of the segregation of lepers, extending over half a century, have there been so many voluntary surrenders as during the past year or two. Direct arrest by deputy sheriffs was formerly the almost universal custom. It seems that the old prejudice of lepers against segregation and their disbelief in any remedial measures have been slowly but surely overcome in Hawaii during the past few years. For this several reasons are given. New and comfortable buildings have been erected in a greatly enlarged compound. The dread of the "Federal doctors" has gradually given way before the tactful administration of successive medical officers of the Public Health Service, "until to-day the medical attendant enjoys the implicit confidence and hearty co-operation of his patients." Further, the increasing number released on parole, apparently cured, scattered throughout the islands, and the publicity given to the station's efforts by the newspapers, have been a powerful aid and stimulus to the work. In regard to treatment, we learn that at the Culion Leper Colony in the Philippines a chaulmoogra clinic is in operation with an average weekly attendance of 700 lepers; Mercado's method appears to be the routine mode of administration. In the Kalihi Hospital, Hawaii, a standard system of treatment was adopted in 1919. This consists of weekly intramuscular injections of the ethyl esters from the mixed fatty acids of chaulmoogra oil, combined with 2 per cent. iodine, and the oral administration thrice daily of the mixed fatty acids of chaulmoogra oil, combined with 2½ per cent. of iodine. The chaulmoogra oil derivatives are prepared in the laboratory of the University of Hawaii, under the direction of Dr. Dean. It is stated that not one of the fifty patients released on parole from the Hawaiian Station since the use of the Dean derivatives was commenced two years before had shown any sign of relapse.

THE EFFECTS OF BETEL-NUT CHEWING.

Medical literature contains a number of references to oral carcinoma in betel-nut chewers, due, as believed, to the chronic irritation thus induced; the data have been mainly obtained from India, Africa, and some of the Pacific islands. As betel-nut chewing is extremely prevalent in Siam, Dr. A. G. Ellis[1] has conducted an inquiry into its effects by sending a set of questions to twenty-five medical practitioners, including those at the various mission stations. Betel-nut chewing is a complex procedure, but the chief ingredients used are betel leaf, areca nut, black catechu, lime-turmeric paste, and tobacco leaf. Three of these are astringent, and the other attributes possessed by or claimed for the substances collectively are carminative, tonic, stomachic, antiseptic, sialogogue, antidiaphoretic, and vermifuge. On the beginner the effects are somewhat like those of tobacco—giddiness and faintness, but no nausea. In the habitual chewer the lips, tongue, and to a less extent the buccal mucous membrane, become brownish-red in colour, and the lips and tongue may be rough. The teeth become dark-brown or almost black from deposit of lime, which almost entirely prevents decay; but the gums recede, the alveolar process undergoes atrophy, pyorrhoea is common, and the teeth loosen. Loss of teeth favours indigestion, and pyorrhoea may play a part in the "rheumatism" so common in Siam; but betel-nut chewing in itself has little or no direct effect in causing constitutional or gastro-intestinal disturbance. Bacteriological examination of the mouths of twenty betel-nut chewers did not support the contention that the practice has any antiseptic value. The impression of a large majority of the medical men practising in Siam was against the view that betel-nut chewing caused oral carcinoma; but the statistics of the Chulalongkorn Hospital of Bangkok for six years showed that out of 102 cases operated upon for malignant disease 52 were of the lip, and that of these 52 cases 29, or 56 per cent., were in men, and 23, or 44 per cent., were in women, thus contrasting in a very suggestive manner with the usual

[1] A. G. Ellis, *Arch. Int. Med.*, Chicago, 1921, xxviii. 252-267.

sex incidence of carcinoma of the lip—namely, 90 per cent. in males. It is also significant that in Siam betel-nut chewing is more nearly universal among women than among men, and that in general women chew more of the substance.

SIR THOMAS BROWNE ON DRAINS AND EMBANKMENTS.

The late Sir William Osler's well-known devotion to Sir Thomas Browne's literary remains makes it the most natural coincidence that other Regius Professors should share this hobby; and it is not surprising that the Regius Professor of the Practice of Medicine in the University of Glasgow, Dr. T. K. Monro,[1] should contribute a scholarly account of a hitherto unpublished letter of Sir Thomas Browne, dated November 16th, 1659, to Sir William Dugdale, who was interested in the subject of embanking and draining, and subsequently acknowledged his indebtedness to Sir T. Browne in his work, *The History of Embanking* (1662). A series of letters on this subject passed between these two well-known literary characters between October 4th, 1658, and April 5th, 1662, and are preserved in Volume I of Browne's works published by Simon Wilkin, who, however, pointed out that the series was not complete. Two letters appear to have been unknown to Wilkin; one of these was discovered fifty years ago and published in *The Eastern Counties Collectanea* for 1872–3. The other, dealing with the fens, belonged to the collection of autograph letters and historical documents formed by Mr. Alfred Morrison, and at his sale was obtained by Professor Monro. With the exception possibly of the postscript and probably of the endorsement it is a holograph letter, and is dated and signed. Though the name of the person to whom it was written does not appear, the contents leave no room for doubt that it was meant for Dugdale; it occupies nearly three pages of a four-page sheet, folio size; and in the lower fourth of the fourth page, at the right hand, it is endorsed in two vertical lines, "Sir Tho: Browne || about the fens." The full text of the letter is given, and in addition there are facsimiles of the beginning and end of the letter.

The next session of the General Medical Council will commence on Tuesday, November 22nd, when the President, Sir Donald MacAlister, K.C.B., M.D., will take the chair at 2 p.m., and give an address.

Dr. Gustav Monod will give one of the occasional lectures at the Royal Society of Medicine on Wednesday, November 23rd, at 5 p.m. The subject will be syphilis of the stomach, a condition about which little is known and of which few specimens exist; some specimens, however, will probably be lent to illustrate the lecture, which will be followed by a discussion, in which Dr. Charles Bolton, Dr. A. F. Hurst, Dr. J. W. McNee, Sir Berkeley Moynihan, Mr. Herbert Paterson, Mr. James Sherren, and Mr. A. J. Walton will take part.

We regret to announce the death, on November 5th, of Major-General Sir George Evatt, K.C.B., M.D., A.M.S. (ret.), at the age of 77. He was a former Member of Council of the British Medical Association. A memoir will appear in an early issue.

[1] *Scottish Historical Review*, Glasgow, 1921, xix, 49–57.

The Society of the New York Hospital, which controls the New York and Bloomingdale Hospitals, and Campbell Cottages for convalescent children at White Plains, was chartered by King George III, and celebrated its 150th anniversary on October 26th. This society is one of the three institutions of New York which trace their origin to colonial days, the others being Trinity Church and Columbia University.

Medical Notes in Parliament.

[From our Parliamentary Correspondent.]

Preservation of Insurance Benefits for Unemployed.

The bill introduced by Sir A. Mond to prolong the insurance of persons unable through unemployment to keep up their contributions was taken in Committee in the House of Commons on November 2nd. On Clause 1, which provides for the extension of period during which such persons may remain insured and the conditions necessary to bring them within the provision, Mr. T. Thomson inquired how much money would be required from the approved societies and out of what resources was it to be provided. Sir Alfred Mond, in reply to this and other questions, said the memorandum pointed out that the additional benefits which would be paid under the measure would be paid by the approved societies. It was difficult to state exactly what these amounts would be, but there was every reason to believe the figure would be between £500,000 and £750,000. The approved societies had a surplus reserve on their valuation of five million pounds. In addition, every society had a contingency fund, and these amounted to two million. They could fall back upon the contingency fund in case of need; therefore there was no occasion for alarm. In answer to Major Wood, the Minister said it was not proposed to give to those who, so to speak, had their contributions paid for them, the fullest benefits. It was proposed to pay (*a*) medical benefits to June, 1923; (*b*) full maternity benefit; (*c*) full additional benefit; (*d*) sickness benefit of 8s. for men and 7s. 6d. for women, compared with the full rates; so that, in regard to sickness benefit, there would be a considerable reduction in the full benefit. The clause was adopted with technical amendment.

Inquiry into Working of Act.

On the Report stage Sir Godfrey Collins said that it was in the recollection of the House that every six months, through the experience gained, or through the faults of the original Act, a fresh Insurance Bill had been introduced. Did not the Minister think the time had arrived when there should be an inquiry into the whole of the working of national insurance? He did not suggest that the amounts paid to the approved societies and to the various officials who were administering the Act were too large, but it might be found that simplification could be effected and economies result.

Mr. J. H. Thomas, on behalf of the Labour party, said they did not want national insurance to be brought within the scope of the usual "anti-waste stunts." Whatever objections there were to the scheme of National Health Insurance, no one who had studied the result of the Acts would seriously suggest that the work should be limited. The need for consolidation was obvious to everyone.

Sir A. Mond said that a Consolidation Bill would undoubtedly be of considerable value; such a measure was practically prepared, and it was a question only of finding parliamentary time. He hoped to be able to introduce such a bill next session. He had been giving considerable attention to the matter of setting up some board of inquiry into the working of national health insurance. Mr. Thomas might rest assured that no attempt had been made on his part to depreciate a service the magnificent results of which were generally recognized by all parties in the country. The approved societies were still engaged in valuations which would take some time to complete. The war upset to a large extent the normal administration. After carefully consulting experts, he thought that those who wished for an inquiry would be well advised not to press for it immediately, but to allow a more normal state of things to come about in which they would see more clearly where they were, and then there could be appointed an important commission, to deal not merely with costs of administration, but with a number of other questions. Captain Elliot expressed disappointment at the statement of the Minister that he proposed to postpone for a long period any inquiry into the Act, for this he gathered to be the effect of what had just been said. Those administering the Act would be glad if the inquiry could take place as early as possible. He thought the upset caused by the war was passing so rapidly that it would soon be possible to take stock of the position, not so much from the financial point of view, as from the benefit point of view. The bill was read a third time and passed.

Milk for Mothers and Children.—Sir Robert Newman asked, on November 2nd, whether, in consequence of Circular No. 185, issued in March, the powers of local authorities to supply milk to mothers and children had been considerably curtailed; and

whether the Minister of Health would consider the advisability of restoring to the local authorities the discretionary powers they previously held. Sir A. Mond said that the conditions imposed by the circular were designed mainly to ensure that milk should be supplied only to necessitous cases, and it was not anticipated that any appreciable reduction would result. Recent estimates indicated that the expenditure of local authorities on milk had increased under the new conditions. The orders under which discretionary powers had existed were made under the Defence of the Realm Regulations, which had now lapsed, and their restoration would not benefit the cases Sir R. Newman had in mind. In answer to another question by Mr. Charles Edwards, Sir A. Mond said that milk should not be supplied at less than cost price except in cases where the income per head of a family was below a scale to be made by the particular local authorities and submitted for his approval. No general instructions were given as to the scale of income to be adopted. Sir A. Mond further stated that the policy to be adopted with regard to grants of milk to necessitous mothers and children after the present financial year was still under consideration.

Insurance Medical Benefit.—Mr. T. Thomson asked, on November 2nd, what reduction the Minister of Health proposed to make in the levy of 9s. per member required from approved societies on account of medical benefits, seeing that doctors' fees were being reduced from 11s. to 9s. 6d. per member. Sir A. Mond replied that the present cost of medical benefit was 13s. 9d. per head; 9s. 6d. was charged to insurance funds, to which the Exchequer contributed the statutory two-ninths; the excess cost of 4s. 5d. a head was met by a special Exchequer grant. The saving due to a reduction in doctors' fees must clearly go in relief of the excess cost charged to the Exchequer.

The Diagnosis of Small-pox.—Mr. R. Young asked the Minister of Health, on November 7th, whether a letter was sent from his Department on September 20th to the medical officer of the Bedford Rural District Council stating that the case of a boy who was diagnosed by the medical officer and by the medical man in charge of the case at the hospital as small-pox was not officially a case of small-pox, as the boy had been successfully vaccinated; whether there were large numbers of cases of small-pox on record in which successful vaccination had been performed either prior to or subsequent to infection by small-pox; and whether he justified the action of a medical officer of his department in refusing to accept the diagnosis of two local doctors solely on the ground that successful vaccination had been performed. Sir A. Mond replied to the first two parts of the question in the affirmative, and in reply to the third part said the case was that of a patient who was successfully vaccinated by his doctor ten days after the appearance of an eruption suspected to be small-pox; after small-pox the medical officer of the Ministry, who saw the patient in consultation with the local doctors, advised them that, although there was originally reasonable cause to regard and treat this case as provisionally one of small-pox the subsequent successful vaccination differentiated it from those cases which it would be proper to enter in the official small-pox register. With this recommendation his medical advisers were in complete agreement. He was advised that although vaccination could be performed successfully at any time during the greater part of the period of incubation of small-pox, immunity to vaccination developed rapidly after the onset of illness, and after the efflorescence was completed the patient was wholly insusceptible to vaccinia.

Small-pox in Glasgow.—In reply to Mr. R. Young, on November 3rd, Mr. Pratt said that of the total number of children under 10 years of age who were attacked by small-pox in Glasgow in the outbreak of 1920, the figures as to families according to the number of rooms occupied were as under: 13 belonging to families living in one room; 66 living in two rooms; 13 living in three rooms, and 2 living in four rooms. Of these 5, 18, 6, and 2 respectively were fatal cases. The particulars excluded four cases from beyond the city boundary.

Medical Officers at Bradford.—Mr. Ratcliffe asked, on November 2nd, if the Minister of Health was aware that the Bradford Corporation employed thirty-three full-time medical officers; to what sum their annual salaries amounted; how did the number compare with the figures of other towns of similar size and population; how did the amount of the salaries affect the taxpayer, and would the Minister take any steps to reduce the total? Sir A. Mond said he had not full information as to the total number of medical officers employed by the Corporation of Bradford; he was concerned only with those whose salaries were charged on grants administered by his department, and he was communicating with the Bradford Corporation as to this portion of their staff.

The Spahlinger Treatment for Tuberculosis.—Sir C. Kinloch Cooke asked, on October 31st, whether any further investigation had been made in the matter of the Spahlinger treatment for tuberculosis, and when it would be available for patients suffering from this disease. Sir A. Mond said he understood that certain unofficial investigations had been made in this matter, but that no definite conclusions had been arrived at. It would not be possible to undertake any independent investigation as to the efficacy of the Spahlinger treatment, which was essential in a matter of this importance, until supplies of the serum were available in this country. He understood that such supplies were not yet forthcoming.

Venereal Disease in the Army.—Sir L. Worthington Evans stated, on inquiry by Major Colfox on November 3rd, that all soldiers suffering from venereal disease were admitted to hospital till active signs of the disease had disappeared and they were fit to return to duty. All such cases were included in the statistical returns. Cases of syphilis had subsequently to undergo a prolonged course of out-patient treatment in barracks, but they were not included in statistical returns after their discharge from hospital unless readmission was necessary, when they were again included in the returns. Asked the incidence of venereal disease amongst British troops in the United Kingdom, in the army of the Rhine, and in the Black Sea in 1919, 1920, and the first six months of 1921, Sir L. Worthington Evans gave the subjoined table. He explained, however, that the figures in brackets for the year 1919, which were afforded on May 18th in answer to a question, had proved, owing to rapid demobilization and other circumstances, quite unreliable. No figures for 1919 were available as to the Black Sea.

Area.	Annual Ratio per 1,000 of Strength.		
	1919.	1920.	January to June, 1921.
United Kingdom ...	[59]	48.30	38.03
Army of Rhine ...	[46]	188.64	148.90
Army of Black Sea ...	—	213.73	238.94

Bellahouston Hospital.—In answer to Mr. D. Graham, Mr. Macpherson stated, on November 3rd, that the report of the committee who inquired into the conditions obtaining in Bellahouston Hospital would be published and placed on sale at the earliest possible date.

Mental Deficiency Acts.—Mr. Ormsby-Gore, on November 7th, asked whether the Minister of Health had received the representation of the Staffordshire Association for the Care of the Mentally Defective regarding the effect of the Treasury circular on the limitation of the spending powers of local authorities on the treatment of urgent cases of mentally defective persons infected with venereal disease, and whether he would take care that the limitations would not prevent local authorities from dealing immediately with such cases. Sir A. Mond said that the representation was being carefully considered in connexion with the general question of limitation of expenditure under the Mental Deficiency Acts necessitated by the decision that public expenditure must be drastically reduced. Local authorities were at present only able to deal with urgent cases of the kind indicated if the expenditure could be met within the limits of their approved estimates for 1920–21.

Dartmoor Prison: Silence Rule.—Mr. T. Griffiths asked, on October 31st, if grave discontent existed among the Dartmoor prison staff in consequence of the tactics of the deputy-governor in his effort rigorously to enforce the silence rule; and whether the Home Secretary knew that medical opinion was against the silence rule. Mr. Shortt replied that there was some misapprehension as to the so-called "silence rule." Medical opinion was not against the existing practice which forbade unauthorized gossip. The fact that during the absence of the Governor of Dartmoor Prison recently another Governor was sent to take charge, carried no reflection on the deputy, the explanation being that the latter had only been a short time in the service.

Medical Chemicals.—Dr. Murray asked, on October 31st, whether the Board of Trade was aware that a large number of proprietary articles of Continental origin included in the Key Industries Schedule of the Safeguarding of Industries Act were used by hospitals, and that, owing to the duty now imposed, these hospitals would have to pay much higher prices; and whether he was prepared to allow a drawback to those hospitals on such medical chemicals, in view of the low state of the finances of those institutions. Mr. Baldwin said that a number of the commodities in the schedules were doubtless of the kind stated by Dr. Murray. The experience of the war years showed, however, the grave danger of dependence upon foreign sources for important medical supplies, and the need of action to prevent, as far as possible, its recurrence. He was not, therefore, willing to introduce legislation to give effect to Dr. Murray's suggestion. Mr. G. Terrell put it that the duties paid were a part of the profit which importers had been making, and Mr. Baldwin thought that that view was probably correct.

Fine Chemicals.—Mr. Baldwin, in reply to Major M. Wood, said he was aware that a number of the names appearing in the lists of chemical products under the Safeguarding Act, were registered trade names of German proprietary articles, but in the majority of cases the equivalent chemical designation also appeared. It was open to British manufacturers in certain cases to manufacture for themselves certain products under the German trade names.

Postal Delays.—Dr. Murray asked, on November 1st, whether the Postmaster-General was aware that frequently postal packets containing packets for medicinal use were held up for over a fortnight when urgently required for hospitals, general practitioners, and the public. Mr. Kellaway understood the reference to be to packets from abroad, and said that if details of particular cases were given him he would have inquiry made.

MOTOR SHOW FEATURES.

A FINAL LOOK ROUND.

[BY A MOTORING CORRESPONDENT.]

INASMUCH as the Motor Show organized at Olympia, Kensington, and the White City, Shepherd's Bush, London, closes on Saturday, there is time for a last glance round only. During the week that it has been open to the public comparatively little of interest to the medical man, apart from the features brought out in the last issue of this JOURNAL, has been discovered. But the opportunity may be taken to gather some odds and ends.

Dealing in alphabetical order with cars not mentioned in the last issue, it may be pointed out that those interested in the larger sorts of vehicles will find a new Italian chassis, the 20–30-h.p. Alfa-Romeo (Stand 179), at the White City. There is also the Alsace car (151). The 15.9-h.p. four-cylinder Arrol-Johnston (270 Olympia) has new all-block cylinders and detachable head, spring gaiters, and other refinements, as well as improved body types. The 11-h.p. Beardmore (244 Olympia) has an interesting overhead silent valve gear. The new 10-h.p. Calcott (310 Olympia) is an £11 tax machine, having a four-cylinder engine of 65 mm. bore and 110 mm. piston travel, giving a cubic content of 1,460 c.cm. This car has a gear-box giving three speeds forward and a spiral bevel-driven back axle, the two-seater being sold for £350 complete. The polished G 3 type Albert chassis (240 Olympia) is the result of extensive road tests conducted last February. Half-elliptic front springs are used instead of the inverted quarter-elliptic type; the frame has been straightened considerably in section and lengthened by 5 in. in the rear to avoid any overhanging of the coachwork. The cross members have been improved with a gain in rigidity. A single plate clutch replaces the leather cone variety used formerly, the plate being lined with an asbestos compound giving easy engagement, and gear-changing is facilitated. A new form of gauge is furnished in connexion with the gear-box that has four speeds forward. The change-speed lever is more robust, and is placed more conveniently. The engine is better installed in the chassis, and the tappet rods to the overhead valves are increased in diameter, though not in weight. The axis of the crankshaft has been inclined backwards, enabling the transmission to be kept in a straight line from the axle to the flywheel when the car is loaded fully. The exhaust outlet is now detachable instead of being cast integral with the cylinders. To render the magneto more easily removable a strap fitting has been adopted instead of the usual four studs at the base. Some of the all-weather schemes on the new Service bodies are also worthy of note. Apart from showing an open touring body upholstered in Bedford grey, a Primos open body and a coupé-saloon to seat three, Carrow cars (45, White City) show an 11.9-h.p. four-cylinder standard Carrow chassis with an engine bore of 69.5 mm. and a piston travel of 120 mm. This construction employs pump lubrication and thermo-siphon cooling. A Claudel-Hobson carburetter is used, also a Watford magneto. The gear-box gives three speeds forward, the change being controlled from the centre. A single plate ferodo-clutch is used in conjunction with spiral bevel gear in the back axle. The price of this chassis with tyres is £445, and as a standard open two-seater, £495.

Developments and Lower Prices.

Galloway Motors (312 Olympia), of Tongland, Kirkcudbright, show a four-cylinder 10–20-h.p. chassis; as examples of it have been in the hands of the public during this year it does not figure as a new car, but it is actually a very different construction from that which marked the first exhibit of this newly constituted firm on the occasion of the last show of the series. The possession of this new car involves the payment of an annual tax of £11, the engine bore being 65 mm. and the piston travel 110 mm. Thermo-siphon water-cooling is used and forced feed lubrication. A high tension magneto is employed and a Zenith carburetter. The gear-box gives three speeds forward, the control being central. A cone clutch is used as well as a spiral bevel-driven back axle. Michelin pressed steel wheels are employed and a Lucas dynamo lighting and electric starting-set. The price of the chassis complete with tyres is £375 delivered at the works. Medical men may note that one of these chassis with a standard coupé to seat two persons and a dickey seat is provided for £495 delivered at the works, the example shown being painted green and upholstered in corded cloth. Perhaps the most important point about the well-proved range of Hillman (277 Olympia) cars of low taxation ratings is that they are now available at attractive prices; thus the 11-h.p. series have been reduced as follows: Two-seater, £495, representing a reduction of £35; four-seater, £550, a reduction of £50; coupé, £570, a reduction of £40; and four-seater with all-weather body, £630, a reduction of £30. The 10-h.p. model has been reduced to £590, which is a reduction of £30. Mechanically these cars embrace the well-tried features of the firm's practice. Thus the 10-h.p. speed model has a four-cylinder water-cooled engine with a bore measurement of 63 mm. and a piston travel of 120 mm., giving a capacity of 1,496 c.cm. It comes, therefore, just within the 1½-litre class, which is going to constitute a notable branch of motor evolution during the next two or three years. In this direction Hillman has always been a pioneer. Magneto ignition, Claudel-Hobson carburetter, detachable cylinder heads, a gear-box giving three speeds forward, and spiral bevel final drive, together with half-elliptic springs fore and aft, are among the other mechanical features of this car. The 11-h.p. model has the same piston travel, but 2 mm. greater bore measurement. In this the cylinder heads are not detachable; a worm drive, too, is employed and a Zenith carburetter. The 11.9-h.p. four-cylinder Morris-Cowley (315 Olympia) chassis comes under the £12 tax class, the engine volume being 1,550 c.cm. The constructional practice of the firm is followed consistently. The four-plate clutch has cork inserts, and the power is transmitted through the gear-box to an entirely enclosed propeller shaft, the final drive being by spiral bevels. The price of the chassis, with Lucas electric lighting set, is 255 guineas. The same chassis details apply in the case of Morris-Oxford *de luxe* model, save that the electric starter and tyres are additional. Thus it will be appreciated that the chassis of the new standard Morris-Cowley car is identical with that of the Morris-Oxford *de luxe*. Considerable modifications have taken place in the 13.9-h.p. Renault (290 Olympia), which was one of the first cars of this engine rating to be placed on the market by a first-class French house. Circumstances have prevented the arrival in this country in any quantities of this model; it is now available, however, to any extent for which a demand may arise, also in appreciably modified form as to detail and finish. In regard to design, of course, the chief novelty for Renault is the introduction of a new large nominal 45-h.p. six-cylinder machine with an engine of over 9 litres in size. Hence it can scarcely be of practical interest to the average medical man. By contrast, the 13.9-h.p. four-cylinder Renault is shown as a coupé complete for £605. A larger Renault model, also with four cylinders, rated at 15.9-h.p., sells as a chassis at £535. Thus the firm's range is sufficiently wide to interest the medical profession, which it has served well since the early stages of the movement. Renault products have well earned their reputation for wearing qualities. The 12-h.p. Austin car, the introduction of which was announced in these columns a short while ago, is not displayed at the current exhibition, but at the firm's large headquarters in Oxford Street. The design follows closely that of the now well-proved 20-h.p. model. The new product is notable for the amplitude of the body accommodation and for its pleasing lines. In fact, it is a typical Austin product brought now well within the purse range of the average medical man. The engine is not highly stressed, and the wearing qualities should, in consequence, be excellent. It is unusual, too, among machines of this rating from the fact that the gear-box gives four speeds forward.

A Glance at the Accessory Section.

Reverting once more to the exhibition, it may be pointed out that, in regard to the accessory section, the chief feature of interest is to be found in the tyre exhibits. The corded variety is standardized by nearly every chassis maker; it gives much longer wearing qualities. But we do not yet see the corded construction employed as standard on cars in conjunction with straight-sided-tyres. The death a fortnight ago of Mr. J. B. Dunlop, at well over four-score years, reminds one of the enormous progress made in the design and production of air-filled tyres since his notable pioneering efforts, as witness the Dunlop Rubber Company's exhibit (492 Olympia) of Magnum cord tyres of the beaded edge varieties built on multi-ply cord casings, as well as of the improved Magnum type standard tyres with beaded edge, and the Magnum cord and canvas type for light cars. The exhibit illustrates, besides, the company's straight-side cord tyres with special rubber non-skid tread, built on the Dunlop multi-ply cord casing. The Belgian

Tyre Company (487 Olympia) shows motor car tyres, comprising sundry types of outer covers introduced by this firm—namely, the V design, all-rubber *de luxe*, the Beldam V groove, the Beldam Bulldog, and the Beldam combination steel drum on V design of cover. There are, besides, rubber inner tubes. The Stepney (475 Olympia) exhibit consists of spare motor wheels, road-grip motor tyres, Stepney tubes, Stepney shock absorbers for Ford cars, and waterproof covers for spare wheels and the like. The practice of encasing springs in gaiters has increased to such an extent as to give to the exhibit of the firm primarily responsible for the introduction of the device to this country, Browne Brothers (450 Olympia), more than passing interest. Here a complete range of Duco leaf spring gaiters is on view together with the firm's mechanical tyre pump, horns, valve stem lubricators, clocks, watches, pumps, rebound snuffers, Klaxon horns, vulcanizers, Celerio jacks, and Eto spare parts for Ford cars, among innumerable accessories. The new triple-diffuser Zenith carburetter (418 Olympia) is introduced at this show; the firm also exhibits special sets of carburetter fittings for Ford cars and most other well known makes. In the carriage work section Offord and Sons (321 Olympia) show three examples of their all-weather bodies. One is called a four-seater featherweight type, with V windscreen, luggage grid, and special tool-box in the step platform, mounted on a 15-h.p. four-cylinder Belsize chassis. The other is also a featherweight four-seater, carried out in a different colour scheme and upholstered in leather, the whole being mounted on a 12-h.p. four-cylinder Rover. The third example is a five-seater, painted elephant grey, picked out in green, upholstered in antique imitation leather to match, the chassis in this case being a 20-h.p. four-cylinder Chevrolet.

England and Wales.

Voluntary Hospitals Commission.

THE following statement regarding the position of the London hospitals and the decision to make immediate emergency grants has been issued by the Voluntary Hospitals Commission:

Emergency Grants to London Hospitals.

The King Edward's Hospital Fund, as the Local Voluntary Hospital Committee for London, have now reported to the Hospitals Commission in regard to the situation of the London hospitals. They estimate that the aggregate deficit on the maintenance account for the year ending December 31st, 1921, will amount to at least £360,000. This is less than the corresponding figure for 1920, but the gravity of the situation is shown by the fact that without exception all the larger general hospitals, including all the medical schools, will show heavy deficits. Moreover, a number of hospitals have now exhausted all their realizable assets, and without immediate assistance will have no alternative but to close beds. It is a condition of the Government grant of £500,000, which has to meet the needs not of London only but of the whole of Great Britain, that a corresponding amount must be raised by the hospitals themselves. As the total deficits for the year were estimated by Lord Cave's Committee at £1,000,000, the importance of the pound for pound rule is manifest. The Hospitals Commission has provisionally appropriated £180,000 for London, which is half the total deficits for the year as estimated by the King's Fund. But if the London hospitals are to earn this grant they must themselves raise a similar amount. In view, however, of the fact that a number of hospitals have already, or shortly will have, exhausted their realizable assets, the Commission has decided in certain cases to make emergency grants in anticipation of the new money which will have to be raised. These grants are in no case more than half the amount of the estimated deficits for 1921; and the Commission has not felt justified at this stage in making emergency grants to any hospitals whose realizable assets exceed their liabilities, as such hospitals not having exhausted their credit are not compelled to close beds immediately, but can continue their activities, at any rate, for the present. It will therefore be understood that the receipt of a substantial grant does not mean that a hospital is relieved of the necessity of appealing to the generosity of the public. On the contrary, as the grant is in no case more than half the estimated deficit, it will be seen that those hospitals which receive the largest share are precisely those which are most in need of additional revenue.

The total amount of the present emergency grant is £77,900, which is to be distributed as follows:

	£
Canning Town	700
East London Hospital for Children	3,000
Elizabeth Garrett Anderson Hospital for Women ...	600
Great Northern Central Hospital	11,000
Hampstead General Hospital	3,400
Hospital for Epilepsy	850
Hospital for Sick Children	4,000
Infants' Hospital	1,000
King's College Hospital	9,000
London Temperance Hospital	2,000
Metropolitan Hospital	750
Middlesex Hospital	3,000
Mildmay Mission Hospital	400
National Hospital for the Paralysed	800
Prince of Wales's General Hospital	2,200
Queen Charlotte's Lying-in Hospital	3,000
Queen Mary's Hospital for the East End	1,000
Queen's Hospital for Children	2,100
Royal Free Hospital	12,000
Royal National Orthopaedic Hospital	3,000
Royal Waterloo Hospital for Women and Children ...	500
Samaritan Free Hospital for Women	800
South London Hospital for Women	800
University College Hospital	12,000
Total	£77,900

North of England Edinburgh University Club.

The fourteenth annual dinner of the North of England Edinburgh University Graduates' Club was held at Newcastle-on-Tyne on November 4th. Dr. D. W. Inglis, of Hebburn, president of the club, presided over a large gathering, and Sir J. Alfred Ewing, K.C.B., F.R.S., Principal of Edinburgh University, was the guest of the evening. Dr. Inglis proposed the toast of "Alma Mater," and in response Sir Alfred Ewing said that Alma Mater had had to adopt a system of birth control, because her children threatened to become too numerous; but she remained eternally young, throwing her branches wider and wider every year. The very existence of a club such as theirs indicated what the university meant to the men who had been students there. A most satisfactory feature of the university life was the keenness and energy with which the men who had returned from the war had taken up their studies again. He was glad to see so many of the University's sons in apparently prosperous circumstances, and he asked them to remember the financial claims of Alma Mater. The University received a very welcome grant from the Government, and it was only a reasonable grant because the Government authorities were beginning now to recognize that the universities played an important part in relation to the State and deserved national support. Last year the total amount thus distributed by a committee to the universities was £1,500,000. He was sorry to say that Sir Eric Geddes, who had the faculty of his family for applying dramatic strokes, had announced that the grant was to be diminished by £200,000 next year, and that was why he had ventured to make his appeal to the sons of Edinburgh University.

University of Bristol.

A novelty among the many methods of propaganda which the University of Bristol is employing, in its appeal for £1,000,000 in connexion with its new developments, is the publication of a pamphlet of forty-eight pages containing photogravures illustrating the work and the many-sided activities of the University. All the photographs are interesting and they are excellently reproduced. Students are shown at work in lecture theatres in the faculties of arts, science, and divinity, in the various libraries and museums, in scientific laboratories and engineering workshops, on geological and botanical expeditions, and on visits to modern engineering plants and factories. In the section devoted to the faculty of medicine there are photographs of the class of experimental physiology, while some of the research apparatus of the professor is shown in detail; other photographs show students in the pathological museum, and research students in the bacteriological laboratories. In another series students are seen at work in the different departments of the Royal Infirmary; illustrations of the department of remedial gymnastics and of the casualty department are given, while in another is shown a class at work on materia medica in the dispensary. A publication of this

kind is much more likely to give to the lay public a comprehensive idea of the conduct of a modern university than many pages of verbal description.

Liverpool.

The offertory at the annual medical service on behalf of the Royal Medical Benevolent Fund amounted to £90 10s. The honorary treasurer, Dr. J. Ernest Nevins, received in addition £7 6s. from medical men who were unable to be present at the service. The expenses were £9 14s. 6d., and it is gratifying to note that the amount to be transmitted to the Fund is among the largest since the institution of the annual medical service. The biennial dinner of the Liverpool Medical Institution was held on Thursday, November 10th, at the Adelphi Hotel.

Scotland.

Venereal Diseases.

A conference of representatives of local authorities and others interested in the prosecution of active measures in Scotland for combating venereal disease will be opened in the City Chambers by the Lord Provost, at 11 a.m., on Friday, December 2nd. Sir Malcolm Morris, Vice-President of the National Council for Combating Venereal Diseases, will give an address on the prevalence of these diseases and the work of the National Council; he will be followed by Sir Leslie Mackenzie, medical member of the Scottish Board of Health, who will open a discussion on the prevalence of venereal diseases in Scotland and the need for an educational campaign. In the afternoon Dr. J. McGregor-Robertson, Chairman of the Scottish Committee of the National Council for Combating Venereal Diseases, will explain the functions and proposed operations of that Committee, and subsequently the problem will be discussed as it affects urban and rural districts respectively. Further information can be obtained from the Secretary, Mr. W. E. White, 30, Renfield Street, Glasgow.

Compulsory Retirement of Married Medical Women.

The Glasgow Corporation passed a resolution on September 8th dispensing with the services of married women whose husbands were in regular employment. In consequence of this resolution a large number of women retired on October 31st from the service of the Corporation, including Dr. Moore, Dr. Williams, and Dr. Norrie, assistant medical officers in the public health department. Dr. Moore, who had been six years in the service of the Corporation, was associated with the tuberculosis branch of the department; Dr. Norrie and Dr. Williams, who had three and two years' service respectively, were connected with the child welfare branch. It is stated that the work performed by these ladies will be carried on, but no permanent appointments to their posts have yet been made. A similar case, which recently occurred in London, has been widely discussed in the lay press.

Glasgow Home for Infirm Children.

The forty-seventh annual meeting of East Park Home for Infirm Children, Maryhill, Glasgow, was held on October 19th, with Mr. James Graham in the chair. The directors' report stated that the growth of the ordinary income was again much more than counterbalanced by the increase in ordinary expenditure, and the sum of £1,666 had had to be taken from the extraordinary account to meet the deficiency in the ordinary revenue; the medical report was read by Dr. A. B. Sloan, and Sir Alexander Gracie, in moving the adoption of the reports, spoke of the great amount of useful and unostentatious work accomplished in the institution.

Rectorship of Aberdeen.

Sir Robert Horne, Chancellor of the Exchequer, was on November 5th elected Rector of Aberdeen University in succession to Lord Cowdray, whose three years' term of office has just expired. The voting in the contest was as follows: Sir Robert Horne (Coalition), 557; Sir Donald Maclean (Independent Liberal), 400; and Professor Soddy, of Oxford University, formerly of Aberdeen University (Labour), 253.

Edinburgh Students' Council.

In the annual report of the Edinburgh Students' Representative Council reference is made to the part played in the industrial crisis last March. The Council was appealed to by the authorities to raise a force of students to assist in the maintenance of food supplies and the essential transport services. In less than a week over 600 students had given in their names and large numbers enrolled in the Defence Force, the special constabulary, and as pumpmen at the mines. The principal of the university gave an assurance that those who were absent on public service would not be thereby prejudiced in their university course; the Secretary for Scotland had expressed the gratitude of the Government to the students.

Ireland.

Loss to Irish Hospitals.

At the annual meeting of the Linen Guild connected with Sir Patrick Dun's Hospital the Lord Chancellor of Ireland, Sir John Ross, in proposing the adoption of the reports of the executive committee and of the treasurer, spoke of the work done by the War Hospital Supply Dépôt in Merrion Square during the war and the efforts made to raise money in connexion with it. He had at one time hoped that it would be possible to dispense with the Linen Guilds, but it was clear that they must be continued. Under the cruel taxation that was falling particularly on the middle classes they had not the means to give as they had done formerly. "In addition," the Lord Chancellor went on, "owing to the disturbed state of the country, a great number of those who formerly were our best supporters are leaving the country. I am sorry for that. I think everybody should stand his ground. But still the fact remains that they are going. We cannot ask them to stay here. Ireland is being impoverished of these good people, and England and Scotland are getting them." In proposing a vote of thanks to Sir James Craig, M.D., the President of the Royal College of Physicians referred to the State support of hospitals. Ireland's proportion of the £500,000 given by the Government to English and Scottish hospitals should have been at least £50,000, but the Chief Secretary had said that they had a Parliament of their own, and that already a Government grant was being given to Ireland.

Proposed Reduction of Certification Fees under the Insurance Act in Ireland.

The following letter has been addressed to the Irish Medical Committee:

National Health Insurance Commission, Dublin.
November 1st, 1921.

I am directed by the National Health Insurance Commission (Ireland) to state, for the information of the Irish Medical Committee, that they have been instructed by His Majesty's Government, in common with other public departments, to take steps with a view to securing a reduction in the cost of expenditure on public services which are borne out of Exchequer Funds. The whole cost of the scheme in operation in Ireland for the provision for insured persons, free of charge, of the medical certificates required in connexion with the administration of the Sickness and Disablement Benefits under the National Health Insurance Acts is defrayed from an Exchequer Grant. In view of the fact that the sum available up to January 1st, 1920, was increased as from that date by 40 per cent. it is imperative upon the Commission to secure a reduction of the cost of this scheme at present falling upon Exchequer Funds, the expenditure under which is almost wholly due to the payments to doctors for issuing medical certificates. In these circumstances I am to request that the Irish Medical Committee, which has on previous occasions arranged, on behalf of the medical profession in Ireland, the terms of the remuneration to be paid to doctors under the scheme referred to, will be so good as to send as early as possible representatives to confer with the Commission as to what reduction is to be made.

I am, Sir, yours faithfully,
J. Houlihan.

Dr. T. Hennessy, Medical Secretary,
Irish Medical Committee.

A "faith healer" has been arrested at Los Angeles on a charge of manslaughter in connexion with the death of a patient whom he had treated; the patient had suffered from rheumatism for some years, and the coroner's jury decided that she died as the result of manipulations by the healer which fractured her limbs.

Correspondence.

THE CURE OF SLEEPING SICKNESS.

SIR,—With reference to the editorial notice on the treatment of sleeping sickness in your issue of November 5th (p. 759), I should like to correct a misapprehension in the last paragraph under which apparently Professor Warrington Yorke laboured when he published his recent critical review in a medium which precluded the possibility of a reply.

The expressed object of the mission, as endorsed by the Colonial Office, is to test out and compare various methods of treatment already in vogue or which may be put forward in the near future (the new German preparation, "Bayer 205," having been specified), and, further, to place the Commission under the general direction of an independent scientist.

As clinical and laboratory experience is a necessity the association has approached Professor J. W. H. Eyre of Guy's Hospital, who was in 1906 chairman of the working party of the Malta Fever Committee, and he has signified his willingness to accept the post of director.

With reference to Professor Warrington Yorke's criticism as to absence of controls, I would point out that the work done by Marshall and Vassallo has been performed by them as Uganda medical officers in the field and in their spare time, without the great advantage of having their patients constantly in hospital and completely under their control, so that they have been unable to carry out all the controls and examinations which would have been possible in a well equipped laboratory attached to a hospital in England. Further, they have carried out a method of treatment which they have found highly successful in practice, and have offered several theories to explain these results.

Taking their actual results as compared with other methods of treatment, the Tropical Disease Prevention Association expects to receive early in 1922 a report embodying all the results of treatment up to that date, and from the partial data already to hand there appears every prospect of these figures completely justifying the claim that this serum method is giving better results than any other in use up to the present, especially when cases of trypanosomiasis from the same countries are compared.

The opinion, based on a clinical observation, that "although the administration of one dose of salvarsan, neo-salvarsan, or atoxyl is sufficient to sterilize the blood stream, symptoms reappear within a variable period, averaging about four months, and the disease progresses to a fatal termination," comes in for adverse criticism, although in the main it corresponds with the results revealed by an analysis of the figures put forward by Professor Yorke, and certainly agrees with the results of animal experiments detailed by Colonel Wenyon in his article (in the same issue of the BRITISH MEDICAL JOURNAL) wherein he states "in experimentally inoculated small animals, such as mice, it is usually possible by means of a single dose of a drug to bring about the disappearance of trypanosomes from the peripheral blood, but almost invariably relapses occur in a comparatively short time and the animals die of the infection."

Finally, the Tropical Disease Prevention Association is not prejudiced in favour of any one method of treatment, but it does consider that fair play should be given to any method which has shown promise of success. This attitude is not conspicuous in Professor Yorke's review.

On the other hand, far from condemning the value of "Bayer 205," in spite of the fact that to the best of its knowledge this secret remedy has been used only on one human patient, the association is, the more readily after Colonel Wenyon's experiments, prepared to investigate its importance. A German expedition, under the auspices of our Colonial Office, is now on its way to Rhodesia to test this treatment with the aid of our medical officers in the colony. The expedition, which I am assured by the Colonial Office is disinteres ed, is entirely financed by German commercial firms who, in view of the present value of the mark and the non-existence of German colonial interests, may or may not be disinterested also. Further, I am informed that the composition of "Bayer 205" will be revealed later. Past experience of German descriptions of the method of manufacture of "606" leads one to anticipate that this revelation may not enable others to reproduce the remedy in question.

It is, perhaps, not fully recognized by tropical experts working at home that treatment of such a disease as sleeping sickness must be administratively and economically practicable on a large scale, as well as scientifically effective in a hospital at home. It cannot be stated too emphatically that the object of the association is to try serum and other methods in the field in order to gauge their respective values for stamping out sleeping sickness.—I am, etc.,

E. T. JENSEN,
Honorary Secretary, Tropical Disease Prevention Association.

London W., Nov. 7th.

A METHOD OF SKIN-GRAFTING.

SIR,—We feel that we cannot allow Dr. Samuel Samuel's short paper on this subject in your issue of October 22nd to pass without comment.

For many years now skin-grafting in various regions of the body has formed an important part of our work in plastic surgery; many thousands of patients have passed through our hands, and in a very large percentage of these skin-grafting has been carried out at some stage or other of their treatment. The procedure has, therefore, become an every-day one in our work and has been placed upon a sound and rational footing.

Esser in 1917 described, in the *Annals of Surgery*, a pressure method which he had used in connexion with ectropion conditions; it is upon this, considerably modified and extended in its field of usefulness, that our present method is based. An accurate mould of the area to be grafted is taken in dental composition; the Thiersch graft is placed upon this with its raw surface outermost; more than one graft may be used; the whole is then pressed into and fixed in position by any convenient means available.

We do not propose to go at further length into a description of technique, for details of which readers are referred to Esser's article quoted above, *Plastic Surgery of the Face* (Gillies), and "Skin grafting of the buccal cavity" (*British Journal of Surgery*, vol. ix, No. 33; Kilner and Jackson).

In regard to results, a "success" is one in which the raw area to be grafted is completely covered with epithelium from the time of operation and which never subsequently shows any denuded patches. Taking this as a standard of success the above method has given us well over 90 per cent. with Thiersch and over 60 per cent. with Wolfe grafts. This high percentage is, in our opinion, due to the principle of pressure dressing.

Dr. Samuel speaks of "the application of the method of lymphangioplasty combined with that of anchored dressings" and makes much of the "feeds." Not one of the thousands of skin grafts we have performed has received any such lymphangioplastic feeding, and we therefore consider that Dr. Samuel is entirely wrong in attributing even part of his increased success to this ingenious procedure. His method of anchoring dressings suggests that he has unwittingly stumbled upon what is, to our mind, an indifferent way of obtaining "pressure dressing," and it is to this that any increase in the number of his successful grafts is due.

Might we remind surgeons that they are always welcome to see this work at Sidcup?—We are, etc.,

H. D. GILLIES, GILBERT CHUBB,
T. P. KILNER, H. B. RUSSELL,
Surgeons to the Queen's Hospital, Sidcup.

Sidcup, Nov. 3rd.

THE ETIOLOGY AND TREATMENT OF VARICOSE ULCERS.

SIR,—I am much interested in the very instructive paper on the above subject in your issue of October 29th by Drs. Grove and Vines, as it reminds me of some experiments I carried out in hospital many years ago. Varicose ulcers can scarcely be called a medical subject, except on the principle that those cases which do not pay are medical and those which do are surgical. However, as my surgical colleagues refused to admit stinking ulcers into their wards, I had no difficulty in appropriating as many cases as I wanted. Varicose ulcers usually occur among the poor, and I found a considerable number of cases among cooks, whose

legs and habits had not been closely inspected by those who should have had an interest in their cleanliness.

When there was extensive ulceration on both legs I immersed the patient in a warm mild saline bath, and she was kept there day and night till the ulcers were nearly healed. When there was burrowing the overlapping skin was slit in as many places as were necessary to allow the skin to lie flat on the underlying surface. The thick margins usually disappeared in twenty-four hours, and the healing was fairly rapid. When the ulcer was confined to one leg and not very extensive, I used a leg bath for six to ten hours daily. In all healing tissues a certain amount of calcium is necessary, and of all the ionizable calcium salts I think the iodide is the best. Each patient had from 8 to 12 grains daily.—I am, etc.,

Liverpool, Oct. 31st. JAMES BARR.

ERYTHEMA NODOSUM.

SIR,—Further evidence of erythema nodosum being an acute specific fever was produced by Dr. J. Odery Symes in the BRITISH MEDICAL JOURNAL of November 5th. In my own description of the disease, published in the *Practitioner* in 1913, which Dr. Odery Symes refers to as "a most convincing paper controverting the rheumatic theory," I regarded the condition as an "infective disease of separate entity." It may be of general interest to quote an extract from a letter, dated August 2nd, 1913, which I received from the late Sir William Osler on the subject:

"Erythema nodosum . . . is a disease in which I am very much interested. It is extraordinarily common here, and the difference in incidence in England and America is very striking. We rarely saw a case at the Johns Hopkins Hospital. The association with tonsillitis is itself suggestive of an acute infective disease."

The obvious importance of the subject is in the necessity of separating the prognosis of erythema nodosum from that of acute rheumatism.—I am, etc.,

London, W., Nov. 7th. A. HOPE GOSSE.

THE TREATMENT OF CUTANEOUS ANTHRAX.

SIR,—In the JOURNAL of July 16th, p. 97, Dr. Ernest F. Neve refers to cases of cutaneous anthrax treated with the actual cautery, which he thinks might be a useful substitute for excision, as practised by Mr. Ogilvie and Mr. Hall. With reference to this, I may be allowed to mention that I have met with excellent results in over 50 cases by scarifying the pustule and about an inch of the surrounding skin and applying finely-powdered potassium permanganate. This was followed up by bathing the part three times a day with Condy's fluid in warm water, a little carbolic oil being applied after each bathing. In some acute cases affecting the face or upper part of the body I have used emetics and a mixture of ipecacuanha and ammonia.

The rationale of the treatment is that the virus of anthrax is an animal poison like that of snake-bite, and the permanganate is an antidote acting directly and immediately, and through the blood and absorbents. Serum injections could be carried out as in excision or the actual cautery.—I am, etc.,

JOHN W. WEIR.

Engcobo, Tembuland C.P., South Africa, Oct. 7th.

SPINAL ANALGESIA.

SIR,—I have read with great interest Mr. Morrison's report on 11,000 cases of spinal analgesia in the BRITISH MEDICAL JOURNAL of November 5th, p. 745. May I be allowed to ask three questions on points which he does not make quite clear, answers to which, I am sure, would be of considerable value coming from one with such a large experience of the method?

1. What strength solution of stovaine does he use? It is impossible to follow out his technique or compare his dosage with that of others without knowing this.

2. Does he use a light (isotonic saline) solution, or a heavy (glucose) one? If the former, in what position does he place his patient during operation?

3. With regard to strychnine, is he prepared to say that it is of definite value, and that cases in which he has used it have been fitter than those in which he has not?—I am, etc.,

London, W., Nov. 7th. STANLEY ROWBOTHAM.

METATARSUS VARUS.

SIR,—In your issue of October 29th is an interesting communication from Mr. Blundell Bankart, in which occurs a statement I am unable to accept without further confirmation. The statement is that metatarsus varus "is due to congenital absence of the internal cuneiform bone." Mr. Bankart bases this statement on the observed facts that in the six feet of three patients under the age of 3 years affected with metatarsus varus, upon which he has operated, "the internal cuneiform bone was absent and represented by *a flat disc of fibro-cartilage* between the base of the first metatarsal bone and the scaphoid." (The italics are mine.) I beg to suggest that the italicized description is that of a *normal* internal cuneiform bone of a child under the age of 3 years.

Mr. Bankart further states that he has "not had the opportunity of examining a patient who has grown up with this deformity." May I refer him, therefore, to Dr. James K. Young's *Manual and Atlas of Orthopaedic Surgery*, 1911, pp. 833-34, where he will see a photograph and radiograms of an undoubted case of double metatarsus varus (under the care of Sir Robert Jones) occurring in an adult, in which the internal cuneiform bones are present on each side as large as usual?—I am, etc.,

London, W., Oct. 29th. PAUL BERNARD ROTH.

Obituary.

EDGAR BEAUMONT, M.D.

EDGAR BEAUMONT was born in 1860 and was the son of Josiah Beaumont of Huddersfield. He entered the Medical School of St. George's Hospital in 1881, and having previously begun his medical work in Yorkshire, he took the diploma of M.R.C.S. in 1883 and those of L.R.C.P. and L.S.A. in the following year. In 1907 he took the M.D. at Durham. After a hard struggle in his early years, he built up a good general practice in the neighbourhood of the Crystal Palace. His ability and happy disposition brought him success, for he had in a high degree the gift of becoming the friend as well as the medical guide of his patients. He touched life at many points; as surgeon to the Norwood Cottage Hospital he kept well abreast of modern developments and never spared himself.

He was a keen horseman and sportsman, and enjoyed his holidays like a boy. Some twenty years ago he collaborated under the pseudonym of Clifford Halifax with the late Mrs. L. T. Meade in a series of detective stories which appeared in the *Strand Magazine;* they had a medical flavour, the investigator having a busy practice in Harley Street. The plots were mainly supplied by Beaumont, who, though urged to continue the series, never found time to do so. A most delightful and unselfish companion, he leaves a gap that his friends will long regret. Although his appearance and sunny manner hardly ever suggested it, his health had long been unsatisfactory, and he had had several short attacks of acute illness since 1914. He was, however, spared the trials of a prolonged invalidism and incapacity for the life and work he loved, for he died in Charing Cross Hospital twelve hours after the onset of cerebral haemorrhage. He leaves a widow and a married daughter.

WE regret to announce the death of Dr. RICHARD PERCY WOODROOFE, of Eccleshill, Bradford, which took place as a result of pneumonia, on October 24th, at the age of 58. Dr. Woodroofe was a native of Dublin, and received his medical education at the Ledwich School, Dublin, and the Yorkshire College, Leeds. He took the diploma of L.A.H.Dub. in 1884 and the L.R.C.S.I. and L.M. ten years later. After holding the posts of surgeon and medical assistant at the Mercer's Hospital, Dublin, he was in general practice at Idle, Greengates, and Eccleshill for thirty-three years. During this long period he had built up an extensive practice in the district and had endeared himself to the hearts of his patients and fellow-practitioners by his cheerful, unassuming and lovable disposition. He was a careful practitioner, always assiduous in the interests of his patients, and a most loyal colleague to his neighbours. His help was at all times at the service of his friends in any time of need, and was cheerfully rendered with punctilious care. His familiar figure will

be greatly missed in the district. He was laid to rest in the churchyard of his parish church in the presence of many members of the local profession and large numbers of sorrowing patients. Dr. Woodroofe was a member of the Bradford Medico-Chirurgical Society, and took an abounding interest in the work of the British Medical Association, being at the time of his death a joint secretary of the Bradford Division. He had also been a member of the Bradford Local Medical and Panel Committees from their commencement. He leaves a widow and three sons, one of whom joined him in practice a year ago.

WE regret to have to record the death of Dr. J. W. STEPHENS of Cardigan; it was due to double pneumonia and came as a distressing surprise to his many friends. He was born at Kilgarren, three miles from Cardigan but in the county of Pembroke, and his long residence in the border town made him well known in the northern part of Pembrokeshire and the southern part of Cardiganshire, as well as in part of Carmarthenshire. He was educated at St. Bartholomew's Hospital, and took the diplomas of M.R.C.S. and L.R.C.P. in 1888. He was at the time of his death the senior practitioner in Cardigan. He was M.O.H. for Cardigan Urban and Rural District Councils and for the port, Admiralty surgeon and agent, inspector of seamen, and medical inspector of schools in Cardiganshire and Pembrokeshire. He was a J.P. for the county of Pembroke and the borough of Cardigan. In a tribute to his memory published in the *Cardigan and Tivyside Advertiser* of October 28th, Sir John Lynn-Thomas, K.B.E., F.R.C.S., wrote: In early life he was a keen athlete and a vigorous football player. . . . He soon became absorbed in practice, closely following the development of medicine and surgery, and the community gained by his alertness and progressiveness and by his continued studentship. . . . His enthusiasm and progressiveness in the evolution of his calling took up more time than his not too robust constitution could afford. In my opinion he paid the great sacrifice for his patients' sake at too early an age. In him the Cardigan Memorial Hospital Scheme has lost an enthusiastic and progressive worker. His attitude towards the value of hospital treatment properly organized was distinctive, and had he been spared he would have been a pioneer in educating people with regard to the place which a hospital takes in the building up of a sound organization for the prevention of avoidable human shipwrecks in sudden storms of illness.

The Services.

AUXILIARY R.A.M.C. FUNDS.

THE usual quarterly committee meeting of the Auxiliary Royal Army Medical Corps Funds was held on October 28th, at 11, Chandos Street, Cavendish Square. Six grants were made to cases in the Benevolent Branch for the orphans of officers, amounting to £158, and forty-six grants in the Relief Branch for widows and orphans of the rank and file, amounting to £1,366.

These Funds are for the relief of widows and orphans of commissioned officers, non-commissioned officers, and men of the rank and file of the Royal Army Medical Corps, Special Reserve, Territorial Force and New Armies, and also for the relief of the children of those who have been so severely damaged in the late war that they need help for the education of children.

Requests for relief should be addressed to the honorary secretary, at the offices of the Funds, 11, Chandos Street, Cavendish Square, W.1.

DEATHS IN THE SERVICES.

Colonel Herbert St.Clare Carruthers, Madras Medical Service (retired), died suddenly of heart disease on September 19th. He was the son of Captain Francis John Carruthers, of the Indian Army, was born at South Stoneham, Southampton, on April 18th, 1856, and educated at Charing Cross Hospital; he took the diplomas of L.R.C.P. and S.Edin. in 1878, and entered the I.M.S. as surgeon on September 30th, 1878; he became surgeon-major and lieutenant-colonel after twelve and twenty years' service respectively, and was promoted to colonel on June 30th, 1908, when he filled the post of Inspector-General of Civil Hospitals, Burma, retiring on September 30th, 1914 He served in the second Afghan war of 1878-80, receiving the medal, and rejoined for service in India during the late war.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

AT a Congregation held on November 5th it was agreed to present an address to Professor G. D. Liveing, who held the Chair of Chemistry from 1861 to 1908, and has resided in the University for every term since he matriculated seventy-five years ago at the age of 19. The address was read by the Public Orator, Mr. T. R. Glover, and was received with applause. It is almost seventy years since Dr. Liveing started the first laboratory for students in Cambridge.

The Senate approved a Grace relating to the granting of titular degrees by diploma to qualified women students in pursuance of the decision of October 20th, 1921.

The following medical degrees were conferred:

M.D.—R. J. Hearn.
M.B., B.CH.—T. H. Somervell.
B.CH.—G. W. Mitchell, R. B. P. Lansdown.

G. B. Batten, M.D.Edin., I. S. Hirsch, M.D.Columbia, E. R. Morton, M.D.Toronto, and C. W. S. Saberton, M.D.Manch., have been approved for the diploma in medical radiology and electrology.

UNIVERSITY OF LONDON.

THE following have been appointed associate examiners for the session 1921-22: Medicine, Dr. C. Bolton, F.R.S., Dr. W. P. S. Branson, Sir J. Charlton Briscoe, Bt., and Dr. Cecil Wall. Surgery, Mr. C. C. Choyce, C.M.G., Mr. H. S. Clogg, Mr. W. Sampson Handley and Mr. C. A. R. Nitch.

The Lords Commissioners of H.M. Treasury have, on the nomination of the University, appointed Dr. T. D. Lister, C.B.E., an Income Tax Commissioner for the University in the place of Sir Cyril Jackson, resigned.

Applications for the University chair of chemistry, tenable at St. Thomas's Hospital Medical School (salary £800 per annum), must be received by the Academic Registrar of the University not later than the first post on November 19th.

Medical News.

THE second social meeting of the Royal Society of Medicine for this session will be held on December 7th, when Fellows and their friends will be received by the President and Lady Bland-Sutton at 8.30 p.m. During the evening Sir Berkeley Moynihan will deliver a short address on "Medicine in Art," with lantern illustrations. On Monday, November 28th, Dr. Guelpa will give a lecture before the Society on the treatment of diabetes by "disintoxication."

THE annual dinner of the Cambridge Graduates' Club of St. Bartholomew's Hospital will take place on Wednesday, November 30th, at 7.30 p.m., at Frascati's Restaurant, with Sir Humphry Rolleston in this chair. Those intending to be present are asked to write to Mr. R. M. Vick, The Warden's House, St. Bartholomew's Hospital, E.C.1.

AT a meeting of the New York Academy of Medicine on October 20th Sir Harold Stiles was the guest of honour and read a paper on "Surgical tuberculosis in children and its relation to the milk problem."

THE Lady Priestley Memorial Lecture of the National Health Society will be given by Professor Edward Mellanby at the house of the Royal Society of Medicine (1, Wimpole Street, W.) on Wednesday, November 16th, when Sir James Crichton-Browne will take the chair at 5 p.m. The subject of the lecture is vitamins and health.

THE thirty-eighth annual dinner of the past and present men students of the Leeds School of Medicine will be held at the Queen's Hotel on Wednesday, November 16th, at 6.30 p.m. for 7 p.m., when Dr. W. H. Maxwell Telling will preside.

AT a meeting of the South-West of England Tuberculosis Subgroup of the Society of Medical Officers of Health, held at Bristol on October 27th, with Dr. B. A. Peters in the chair, it was agreed that future meetings should be held on the same date and at the same place as the West of England Branch of the Society. A subcommitte was appointed to make representations to the Ministry of Pensions with regard to the drawing up of reports. Several recently advertised sanatorium appointments carrying a salary of £500 to £700 per annum, with board and residence, having been confined to unmarried men, the subgroup requested the council of the society to urge the Ministry of Health not to sanction such advertisements, as being against the best interests of the patients and the status of the tuberculosis branch of the public service. A resolution was also passed that the security of tenure now granted to medical officers of health ought to be extended to the tuberculosis service.

THE first American Birth Control Conference is being held in the Hotel Plaza, New York, from November 11th to 13th, and it has been announced that following the conference clinics will be opened in several of the southern States where there are no laws prohibiting them.

WE are informed by its President, Mr. C. V. Drysdale, D.Sc., that the Malthusian League, whose object is to educate public opinion to the necessity for birth control, has established a pre-maternity, maternity, and child-welfare centre at 153A, East Street, Walworth, S.E.17. Whenever the circumstances clearly point that on medical, hygienic, eugenic, or economic grounds, restriction or spacing of births is necessary, medical advice and instruction will be given on this matter. Two doctors and a nurse will attend at the centre.

A SHORT course of lectures and clinical demonstrations in heliotherapy, with special reference to surgical tuberculosis, will be given at Leysin, Switzerland, from January 10th–14th, 1922, by Dr. Rollier and his assistants. Applications must be received by Dr. Rollier, Les Frênes, Leysin Village, before December 15th, from whom further particulars can be obtained.

THE annual meeting of the Radiological Society of North America will be held at Chicago from December 7th to 9th; among the speakers will be Dr. Guilleminot of the Faculty of Medicine, Paris, and Dr. Wintz of Erlangen.

THE third Argentine National Antituberculosis Conference was held at La Plata from October 23rd to 28th, and, in addition to addresses on different aspects of the disease, such matters as compulsory insurance against sickness and the necessity for cheap housing were discussed.

THE Ministry of Health is issuing a number of pamphlets giving popular instruction on the subject of food and nutrition. One report in this series, by Dr. J. M. Hamill, was discussed recently in a leading article in this JOURNAL (October 29th, p. 713), when the value of its publication at the present time was emphasized. A memorial is now being organized by the Bread and Food Reform League from members of the medical profession and of scientific societies to the Minister of Health, suggesting that the next pamphlet to be published by the Ministry should make direct reference to the important mineral content of oatmeal and whole wheatmeal, and the necessity for grinding in a digestible form. As bread forms the principal food of a large section of the population, especially children, the memorial suggests that the value of finely g ound whole wheatmeal bread and the importance of the germ being retained in household bread should also be pointed out.

THE famous Swedish prize entitled the Berzelius medal has been conferred on Professor E. Abderhalden, of Halle, for his researches on biochemistry.

THE President of the French Republic has made Dr. A. D. Bevan an Officer of the Legion of Honour for services rendered to medical science and education as president of the American Medical Association during the war.

SIX of seven defendants composing the Thompson Treatment Co., which sold a consumption cure, were, according to the *Journal of the American Medical Association* of October 15th, found guilty in the federal court of San Antonio, Texas, on the charge of using the mails to defraud.

THE thirteenth course of Herter lectures was given at Johns Hopkins University on October 5th, 6th, and 7th, by Sir Arthur Keith, on the subject of "The differentiation of modern races of mankind in the light of the hormone therapy."

ON September 25th a monument commemorating Cesare Lombroso was unveiled at Verona, his native town.

IN an editorial notice in *Deutsche medizinische Wochenschrift* for October 13th, Professor J. Schwalbe protests vigorously against the custom of honouring prominent scientists in Germany by publishing "Festschriften." It seems that these publications sometimes appear in a medical journal, and the subscribers who do not wish to pay as much, say, as 450 marks for a special number have to break the continuity of this particular journal to which they may be regular subscribers. As for the contents of this kind of publication, Professor Schwalbe speaks of them with withering contempt; the authors, he says, have often been whipped-up for the occasion, and the result is accordingly "literature" which, if the recipient of this honour ever troubles to read it, must materially diminish the pleasure the recipients are supposed to derive from such dedicatory works.

IN the recent municipal elections many doctors have been elected to the town councils all over the country. In Leicester, for instance, two medical men gained seats, Dr. J. Donald and Mr. C. J. Bond; in Sheffield, Dr. W. D. Mart gained a seat with the large majority of 2,934.

THE school of hygiene of Johns Hopkins University, U.S.A., is preparing plans for an expedition for the purpose of studying problems of dietetics, nutrition, and sex among the Eskimos; Dr. Victor E. Levine, of the Creighton School of Medicine, Omaha, has already started with a small party to make a preliminary survey.

THE annual meeting of the Alberta Medical Association was held recently in conjunction with the clinical congress of the Alberta section of the American College of Surgeons at Calgary.

AS was noted in the BRITISH MEDICAL JOURNAL of October 8th last (page 572), the twenty-seventh Congress of the Italian Society of Internal Medicine was made an opportunity for celebrating the ninetieth birthday of Professor Cardarelli and Professor Maragliano's fortieth year as a clinical teacher. We have received a copy of the Neapolitan periodical *La Riforma Medica*, in which are given the letters of congratulation and homage sent to these well-known men of science on this occasion by distinguished pathologists, clinicians, and others from all the world over. Included among them are tributes from Oxford, from Cambridge, from the President of the British Medical Association, and from the Editor of the BRITISH MEDICAL JOURNAL.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.

2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.

3. MEDICAL SECRETARY, *Mediscera, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin:* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

"P." asks for suggestions in the treatment of a case of leucodermia which has resisted all local applications and internal remedies. Is electricity of any value, and, if so, in what form?

"C. S." asks whether extensive acne with numerous pustules, on the back and front of the chest and on the back of the neck of six years' duration, should be considered a disqualification in a candidate for a public service.

INCOME TAX.

"CUIQUE SUUM" purchased a practice early in 1921, and is being assessed for 1921–22 on the previous three years' profits of his predecessor, who has acted as locumtenent or assistant since the transfer of the practice.

*** As our correspondent points out, his own income is likely to be less than his predecessor's. There appear to be two means of redress open to him: (1) To claim that he succeeded to that portion of the practice which did not include surgical operative work, and that the three years' profits on which he is assessed should be exclusive of that source; or (2) to accept the assessment as it stands and lodge an application for its revision at the end of the year on the ground that there is a "specific cause" which renders the three years' average unfair, the "specific cause" being the payments made to his predecessor. The former course would be

difficult owing to the impossibility of separating the past fees for surgical work, and the latter would, by substituting the profits of the year for the basis of the previous three years' average, give more substantial relief apparently. As regards the claim for renewal of the car, we think that the maximum is £360–£180=£180. The claim to £350 assumes that the car purchased was new, whereas it was, in fact, second-hand. Apart from the car in hand (which represents capital outlay) the out-of-pocket cost has been £180 only.

"ENQUIRENDO" has bought a practice and is making payments by instalments; he asks if he can make any deductions on that account.

*** No. The payments are of two kinds, capital and interest; the former is specifically excluded by the Income Tax Acts, and "Enquirendo" is entitled to deduct tax from the interest payments, and, therefore, must include them in the return of profits.

CANCER HOUSES.

DR. J. P. WIGHTMAN (Scalby, Yorkshire) writes: A few years ago there was in a small village in Yorkshire an empty farm-house called the Cancer House. It was demolished for the owner by a healthy farmer, who soon afterwards developed cancer of the intestine from which he died. His house-keeper, who took his meals up to him, and who probably spent some time in the dust and lime, also developed cancer of the breast. My mother, at the age of 54, went to live in a house about 250 years old; she died from cancer of the liver. Some ten years afterwards a lady who lived in the same house developed cancer of the intestine.

Is it in any way possible for one of the causes of malignant disease to be present in the structure of property that has been inhabited for two or more centuries? I have made inquiries about literature on this subject, and so far have failed to hear of any.

*** The idea that there might be some connexion between cancer and particular houses has at various times occurred to a good many people, and there is a considerable amount of literature to be unearthed; but nothing at all conclusive has been observed. Half a century ago Fleissinger stated that in the part of France in which he practised cases of cancer were particularly numerous in old houses on the confines of forests. The existence of this association does not seem to have been confirmed by others, and so far as we are aware Fleissinger has published nothing more about it. Some years ago some members of the British Medical Association in the Midlands arranged to make an inquiry, but we are unable to put our hands on the reference, and nothing has been heard of the matter recently. At the meeting of the Ulster Branch of the British Medical Association on April 30th, 1910 (BRITISH MEDICAL JOURNAL, 1910, vol. i, p. 1171), Dr. John Campbell discussed the matter of cancer houses, and related some examples of what he believed to be instances of the condition. The result of inquiries made by the Imperial Cancer Research Fund, as related in the annual reports for 1913 and 1914, were noted in the BRITISH MEDICAL JOURNAL of 1913, vol. ii, p. 256, and 1914, vol. ii, p. 190; they did not tend to support the belief in cancer houses.

LETTERS, NOTES, ETC.

MEDICAL WOMEN'S FEDERATION.

WE are asked to state that the discussion on birth control reported in our columns of October 29th, p. 708, took place at a meeting of the London Association of the Medical Women's Federation, and not at a meeting of the Medical Women's Federation, which comprises all the local associations of London and the provinces.

HERPES ZOSTER AND VARICELLA.

DR. W. H. WHITCOMBE-BROWN (Westcliff-on-Sea) writes: In view of the recent correspondence and articles the following recent cases may be of interest to your readers: T. I. R., the father, developed herpes of the face and neck on September 4th, 1921; H. R., the son (an adult living at home), developed very well marked profuse chicken-pox on September 19th.

APPLICATION OF RADIUM TO THE PROSTATE GLAND AND BASE OF BLADDER.

DR. R. H. BROWNE-CARTHEW (London, S.W.) writes: It is not so generally known as it deserves to be that certain conditions of the prostate gland, and of the base of the bladder, unsuitable for operation, and very tedious and unyielding in treatment by drugs, can be beneficially affected by the action of radium applied per rectum. The conditions referred to are those of chronic congestion, with haemorrhage, chronic inflammation, and chronic enlargement of the prostate, and to such growths of the base of the bladder as papillomata, with haemorrhage. The cases of chronic prostatitis include those which result from gonorrhoea. The treatment is simple and painless.

FLEAS.

DR. E. FRASER (Great Bedwyn) writes in reply to "A. B. S.": Many years since the late Rev. D. A. Herschel, who went extensively amongst the poor, told me that he always used essence of thyme and that it quite protected him from the annoyance of fleas. Shortly after this I moved into a large old house, which had been empty for about two years, save for a caretaker and his very dirty family, who had occupied the room which we used as a night nursery. The first night revealed the fact that the room was swarming with fleas, so the next day I sprinkled about a tablespoonful of essence of thyme over the beds, beddings, and fleas, with the result that the children were not troubled with fleas again. Since then I have often recommended the same treatment for the clothes and have generally found that it has been successful. If "A. B. S." cares to try it I shall be glad to know if it affords him any relief.

CRITICISM WITH A PUNCH.

EVERY doctor loves *Punch*. What other friend can be so depended upon to amuse the waiting patient while lunch is finished in comfort or the previous notes of the case are looked up? And the *Punch Almanack for 1922* is delightful. It is an old story that *Punch* was never as good as it used to be, but there never can have been such humour as in the new *Almanack*—such unconscious humour we mean. There is, of course, a well known daily newspaper for people who can't think, as well as several picture papers for those who can't read, but the provision of ready-made criticism for reviewers who can't write is an even more modern development of journalism. We mentioned lately (September 17th, p. 455) the growing practice with certain publishers of sending out with the copies of a book to be reviewed printed or typed statements, more or less fulsome, on the scope of the book and the success of the author in dealing with his subject. *Punch*, old as he is, is usually up to date, and his publishers have included in the review copy of the *Almanack* which we have received, a leaflet that has given us more genuine amusement than all the humorous drawings, articles, and light verse, excellent as these are. This leaflet points out that the art editor contributes four page drawings in colour, and says that "each one burlesques with a really remarkable cleverness the work of one of the great Masters. . . . This series will deservedly attract a very great deal of attention." Another famous artist "contributes a most interesting series of ten pictures," a younger *Punch* recruit "provides a very funny series," and other pictures are referred to as "by Mr. Punch's gifted artists." The literary contributions are dismissed in more summary fashion, but the printer receives a kindly pat—"the colour section is wonderfully well produced as usual." The last sentence states that "the *Almanack* is modestly priced at one shilling, and can be recommended as excellent value for the money from the point of view of both quality and quantity"; but it would be worth even more money if the publishers would put their thoughtfully provided self-criticism into every copy.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 32, 33, 36, 37, and 38 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 34, 35, and 36.

THE appointments of certifying factory surgeons at Broughty Ferry (Forfar), Inverary (Argyll), and Peterhead (Aberdeen) are vacant.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	9	0
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Whole single column (three columns to page)	7	10	0
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Half page	10	0	0
Whole page	20	0	0

An average line contains six words.

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NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.